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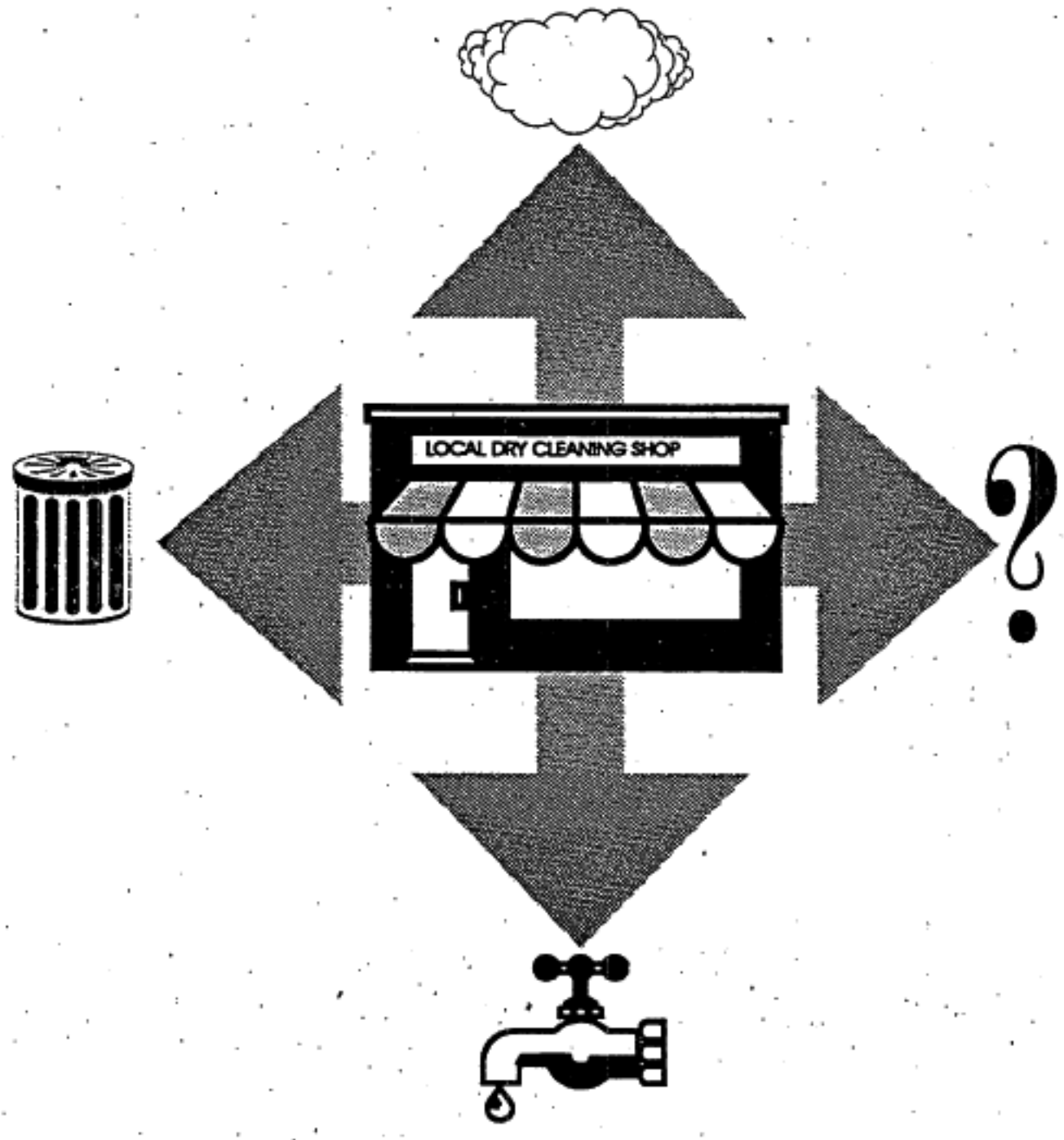
Multimedia Inspection Guidance For Dry Cleaning Facilities



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CHAPTER 1

INTRODUCTION

Statement of Goals:

This inspecion manual was developed to assist field personnel in State, local, and EPA regional offices in conducting multimedia inspections of perchloroethylene (perc) dry cleaning facilities. Its primary goal is to enable inspectors to fulfill the traditional objective of assessing the compliance status of individual facilities by providing specific information about the dry cleaning process and a comprehensive summary of all EPA environmental regulations applicable to perc dry cleaners. However, the manual also focuses on the important goal of overall improved environmental quality by approaching the inspection process with the added objectives of providing compliance assistance to facilities and identifying pollution prevention opportunities.

Section Overview:

To familiarize the inspector with the dry cleaning sector, Chapter 2 first presents an industry overview that describes the chemicals and processes used and provides some information on the demographics of the industry. Chapter 3 describes dry cleaning processes and equipment and summarizes the various wastes that are generated. Actual processes and equipment will no doubt vary from plant to plant, but this section will introduce the inspector to the fundamental operating principles of a typical facility.

A knowledge of the applicable EPA environmental regulations is essential to performing a thorough inspection. Chapters 4, 5, 6, and 7 are an interpretive guide to EPA air, hazardous waste, wastewater, and drinking water regulations that are likely to be applicable to dry cleaners. Specific citations to the Code of Federal Regulations (CFR) are also provided for reference purposes. Chapter 8 goes beyond EPA requirements and presents additional ideas on pollution prevention and waste minimization. Finally, Chapter 9 describes the inspection protocol and identifies what the inspector should be evaluating.

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CHAPTER 2

PERC DRY CLEANING INDUSTRY OVERVIEW

The dry cleaning industry provides its customers with professional cleaning services, primarily for clothing. The equipment and method of cleaning are similar to the regular laundry process, except that a solvent other than water is used. Clothes are placed into a washing machine, cleaned, and then tumbled dry in a dryer. Dry cleaning is used for clothes that would otherwise be damaged by the regular laundry process, such as clothes made from delicate fabrics or clothes made of wool, which can not be saturated in water.

The dry cleaning process produces toxic wastes containing varying concentrations of the cleaning solvent. By far, the most common solvent used in the dry cleaning industry is liquid perchloroethylene (also known as perc, PCE, and tetrachloroethylene). Perc is typically recycled and reused repeatedly in a dry cleaning system, but the recycling process produces perc-contaminated hazardous solid wastes. Dry cleaners also emit perc vapors and produce perc-contaminated wastewater. The use of solvents other than perc, such as Stoddard solvent, is becoming increasingly rare due to health, safety, or environmental regulations associated with their use. (See Section 7.5.)

The almost universal popularity of perc stems from its non-flammability and its excellent cleaning properties. However, there are hazards associated with its use. Perchloroethylene is a suspected carcinogen and has been found to be moderately toxic to humans. The toxicity can be quantified as an LC_{50} (50 percent lethal concentration) of 18 parts per million (ppm) (in water) after 48 hours of exposure for *daphnia magna*, a sensitive water flea commonly used for toxicity tests.

Contact with perc vapors can irritate the eyes and throat, and inhalation can cause lightheadedness and/or dizziness. The Occupational Health and Safety Administration (OSHA) has set the concentration limit for the inhalation of perc vapors in the workplace at an 8-hour time weighted average (TWA) of 100 ppm. Concentrations of more than 200 ppm (but at no

time exceeding 300 ppm) are allowed for only 5 minutes during each 3-hour period. Direct contact with liquid perc causes skin burns and blisters. Liquid perc can also be absorbed through the skin. It is classified as a pollutant in air and water regulations and its disposal is regulated as a hazardous waste. It is not, however, listed as an acutely hazardous waste. Perc-related information is summarized below in Table 1.

Table 1. Perchloroethylene Data Table

Form:	Colorless liquid at room temperature
EPA Hazardous Waste # (unused perc):	U210
EPA Hazardous Waste # (perc-based wastes):	F002
Fire Potential:	Non-flammable
OSHA[1] 8-hr. TWA[2] for inhalation:	100 ppm
Ecotoxcity (*Daphnia magna* LC 50):	18 ppm in water for 48 hrs
Specific Gravity:	1.62 at 68°F (20°C)
Weight:	13.46 lb/gal (1.62 kg/l)
Chemical Formula:	$Cl_2C:CCl_2$
Solubility in H_2O:	150 ppm at 77°F (25°C)
Boiling/Condensation Point:	250°F (121°C)
Melting/Freezing Point:	-2°F (-19°C)

[1]Occupational Safety and Health Administration
[2]Time-weighted average

The dry cleaning industry can be divided into three subsectors, according to the services provided by the facilities. Coin-operated dry cleaners (SIC 7215[1]) are those that are operated by the customer and generally do not provide accessory services such as starching and pressing. Coin-operated machines are usually found in regular laundromats. Commercial dry cleaners (SIC 7216) are the second, and by far the largest, category, comprising about 80 percent of the industry. These cleaners provide professional dry cleaning services for retail customers. Industrial dry cleaners (SIC 7218) are fewer in number but are generally larger facilities that provide bulk dry cleaning of uniforms, rags, and linens for business and industrial clients.

[1]Standard Industrial Classification Code, assigned by the Department of Commerce.

Two distinguishing demographic features of the dry cleaning industry are critical to the issue of compliance with environmental regulations. The first is that the dry cleaning sector is comprised of a large number of facilities, many of which are small, family-run operations. Approximately 90 percent of these facilities employ fewer than 100 people and can be classified as small businesses.[2] EPA's *Dry Cleaning Sector Compliance Strategy* estimated that the actual number of perc dry cleaning facilities range from 25,000 to 35,000. The number of facilities alone makes it difficult to ensure that each and every owner is aware of all currently applicable environmental regulations. In addition, small businesses are much less likely to be members of such national trade organizations as International Fabricare Institute (IFI) and Neighborhood Cleaners Association. These organizations are a traditional channel of distribution for trade-relevant information—owners that are isolated from such organizations may be unaware of environmental regulations and compliance methods.

Another defining characteristic of the dry cleaning industry is the large percentage of owners and operators that speak a language other than English as their first language. About 30 percent of operators speak Korean as their first language, while a comparable segment speaks Spanish. There are also smaller segments of the dry cleaning industry that are Chinese, Vietnamese, or French-speaking. This multilingual aspect of the dry cleaning industry also poses barriers to regulatory compliance. Non-English-speaking groups are also less likely to be members of national trade associations and often fail to receive the information distributed along these channels. In addition, the literature that is received by these groups is generally in English and may not be understood. To address this problem, EPA has implemented a program to translate published brochures and other information about regulations into foreign languages, particularly Korean and Spanish.

Both the unconsolidated nature and multilingual aspect of the industry result in communication barriers that must be overcome to achieve the goal of improved environmental quality through compliance with environmental regulations. Both characteristics are reasons for

[2]As defined by the EPA Interim Policy on Compliance Incentives for Small Businesses of June 13, 1995.

the emphasis on providing compliance assistance during inspections, as well as assessing compliance status.

CHAPTER 3

PERC DRY CLEANING PROCESS, EQUIPMENT, AND WASTES

3.1 Perc Storage and Delivery

Perc is delivered either in tank cars or in drums. Drums can be stored on-site, and the perc pumped to the dry cleaning machines as needed. However, in areas where delivery of perc is frequent (weekly or monthly), there is really no need to store perc on-site at all, since it can be pumped directly from the tank car to the dry cleaning machines. Most machines are designed so that the perc can be added through the button trap door, the same opening from which the button trap (see Section 3.5, Used Perc Filtration) can be removed for cleaning.

3.2 Perc Dry Cleaning Processes

Professional dry cleaning services include (1) spotting, or treating stains with various chemical spotting agents before washing, (2) machine washing in liquid perc, followed by drying, and (3) pressing, starching, and finishing.

Spotting involves the use of various chemical spotting agents. The spotting process does not ordinarily produce significant wastes, since the chemicals are sprayed onto the clothes before they are loaded into the machine. Unless there is a spill, the use of these chemicals is more likely to be subject to OSHA regulations rather than EPA regulations. Pressing, starching, and finishing are labor intensive but generally do not involve the use of hazardous materials.

The machine washing is done in perchloroethylene. This step is of primary concern to the inspector. The processes involved are discussed in detail in the following section.

3.3 Machine Cleaning Steps

The machine cleaning process can be divided into six steps: charging, washing, extraction, transfer of clothes, drying, and aeration.

- **Charging.** Charging of the perc involves the addition of small amounts of water and detergent to the perc to aid in removal of water-soluble soils and to improve the cleaning capabilities of the perc.

- **Washing.** Soiled clothes are manually loaded into the perforated steel drum of a washing machine, which is then filled with charged perc. The drum is then rotated and agitated until the clothes are cleaned. During this process, the perc is continuously passed through a filtration unit at a rate of up to 240 changes per hour (cph) to remove accumulated soils and dyes.

- **Extraction.** After the wash cycle, the perc is extracted from the drum by draining and spinning at high speed, which forces the perc out through the perforations. Like the wash and rinse cycles in a home laundry machine, the washing and extraction steps are repeated once to clean the clothes thoroughly. Extracted perc is piped to the filtration unit where it is reconditioned for reuse.

- **Transfer of Clothes.** If the dry cleaning process is taking place in a transfer machine, in which the washing and drying steps occur in separate chambers, then the clothes must be manually transferred between them. The air in the system at the end of the extraction cycle is directed away from the machine when the washer door is opened in order to limit workers' exposure to perc vapors. This airstream is passed once through the main perc recovery system (although these are technically residual vapors), and then vented to the atmosphere. Even if the venting precaution is observed, this step of transferring clothes damp with perc exposes plant workers to perc fumes and is a major source of perc emissions to the atmosphere. For this reason, new EPA regulations have prohibited the installation of new transfer machines in dry cleaning operations.

  If a dry-to-dry machine is used, the transfer step is not necessary. Washing, extraction and drying take place in the same chamber and the machine door need not be opened until the clothes are dry.

- **Drying.** The clothes are dried in a tumble-dry process. Clothes are dried for 12 to 24 minutes in a rotating drum and cooled in a short cycle of unheated air. Exhaust air from this step is continuously passed through a main perc recovery system, where the perc vapors are removed and collected for reuse. The outlet air from the recovery system is returned to the dryer for reuse, resulting in a closed-loop system. No process emissions are vented during the actual drying step.

- **Aeration.** This final step involves briefly passing fresh air through the dried clothes to remove trace amounts of residual perc before handling. Because fresh air with no perc content is needed for this step, the aeration exhaust cannot be recirculated and must be vented to the atmosphere, either directly or through a residual perc recovery system. The aeration continues while the clothes are being unloaded from the dryer, to protect the worker from vapors that might otherwise escape from the machine.

3.4 Dry Cleaning Equipment

Modern dry cleaning equipment is available in integrated units that incorporate perc recovery operations as well as the washing and drying steps. All dry cleaning systems can be classified as either transfer machines or dry-to-dry machines (see **Figure 1**). Transfer machines are those that wash and dry the clothes in two separate chambers. Transfer of the clothes from the washer to the dryer is manual. Dry-to-dry machines, on the other hand, wash the clothes and dry them in the same chamber. As the name implies, the clothes go in dry, and they come out dry.

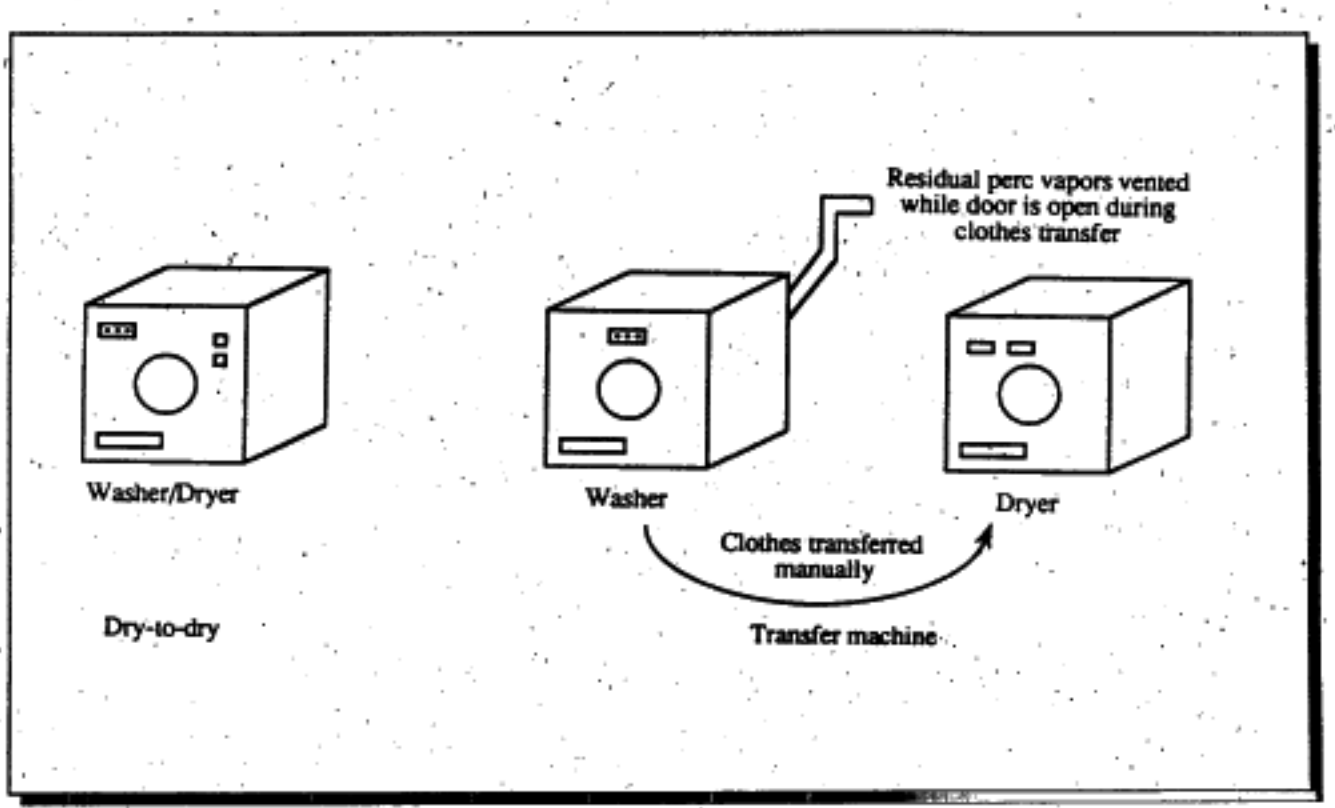


Figure 1. Dry-to-dry vs. Transfer Machines

Transfer machines are becoming increasingly rare in modern dry cleaning plants for several reasons. Concern over perc vapors released inside and outside the plant has led to stringent EPA and OSHA regulations regarding the use of these machines. Most significantly, new EPA regulations are phasing out the use of transfer machines by prohibiting the installation of any new transfer machines. Other disadvantages are that they require more space and labor to operate. The one advantage of transfer machines over dry-to-dry machines is that one batch

of clothes can be washed while the previous batch is drying. The majority of modern dry cleaning facilities now employ only dry-to-dry machines.

Loading capacities of dry cleaning machines range from 8 lb (4 kg) for coin-operated dry-to-dry machines to large industrial machines with capacities of about 140 lbs (64 kg) for dry-to-dry machines and about 250 lbs (114 kg) for transfer machines. A typical size for a machine in the commercial dry cleaning sector is one with a 40 lb (18 kg) capacity.

3.5 Perc Recovery Processes

The $5-a-gallon purchase price of perc (in 1995) combined with costs for disposal of perc-based hazardous wastes make it economical to recover and purify it for reuse. The attached Dry Cleaning Plant Process Diagram (**Figure 2**) details the integration of the perc recovery process with a dry cleaning machine. The equipment differs from plant to plant, but generally incorporates the following processes: used perc filtration, perc distillation, perc vapor recovery, perc/water separation, and additional perc recovery from wastes.

Used Perc Filtration (recovery of used perc from washer)

Used perc extracted from the washer is first passed through a mechanical screen, known as a button trap, to remove large objects, and a finer screen to remove lint. Objects and lint trapped by these screens should be handled as hazardous wastes. After passing through these screens, the perc is filtered through a main filter to remove most insoluble particulates that may remain in the used perc, producing a clear filtrate. This filtered perc is then returned to the washer drum and the process is repeated at a rate of up to 240 changes per hour (cph) during the wash cycle.

There are two types of main filters that are used in the dry cleaning industry. Cartridge filters are the most common and produce spent cartridges which are contaminated with perc. These cartridges are drained or steam stripped before disposal under hazardous waste regulations. Powder filters are becoming quite rare, but are still used and produce spent filter powder as filter waste. This waste is known as filter muck and is further treated in a muck

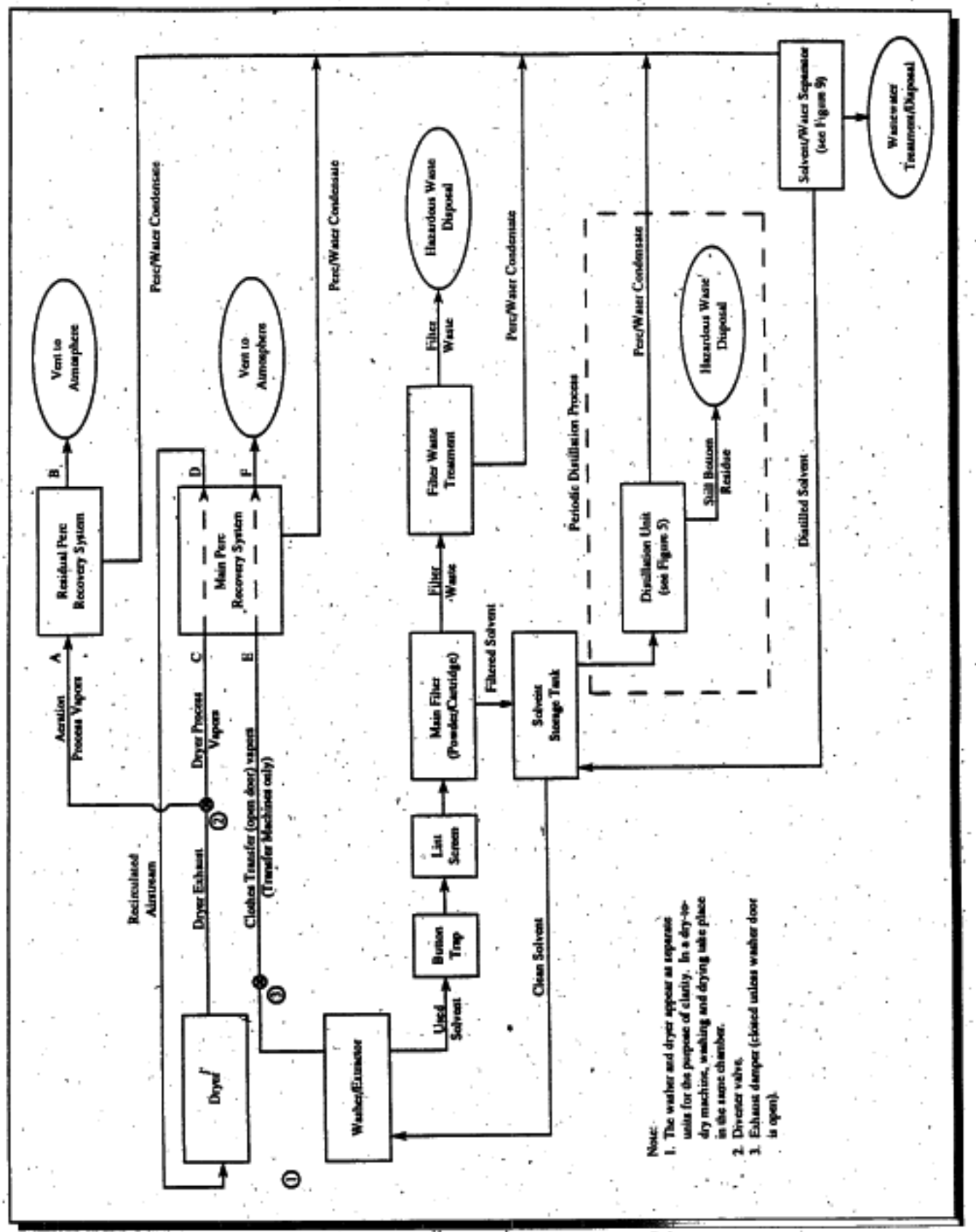


Figure 2. Dry Cleaning Plant Process Diagram

cooker to recover additional perc before disposal. Filter wastes, along with still bottom wastes (described below), are a primary source of hazardous wastes.

The main filter may also be followed by a polishing filter to provide additional removal of trace amounts of insoluble soils. Main and polishing filters, as well as the muck cooker, are described in more detail in the perc recovery equipment section (Section 3.6).

Perc Distillation

In addition to continuous filtration, perc must be occasionally distilled to remove soluble oils and greases, dyes, and other non-volatile residues. In order to maintain solvent quality, all perc in a dry cleaning machine may need to be distilled daily.

Distillation is a process which involves heating a mixture to separate the volatile portion from the non-volatile portion. When filtered solvent is distilled, a perc and water mixture is vaporized and collected. This mixture is considered pure and is sent to the perc/water separation process. The residue that remains at the bottom of the distillation vessel is referred to as still bottom residue. This residue is the other primary source of hazardous wastes stemming from the dry cleaning process. The distillation unit used in this process is further described in Section 3.6.

Main Perc Vapor Recovery (recovery of drying step emissions)

The main perc vapor recovery system collects some of the perc vapors evaporated during the drying step of the cleaning cycle. This perc does not contain significant amounts of impurities and does not need to be re-distilled. The airstream leaving the recovery system contains a reduced amount of perc vapors and is recirculated back to the dryer and reheated for reuse during the drying process. This process is closed-loop and should not vent any perc emissions to the atmosphere.

Main perc recovery systems will recover perc vapors from the dryer exhaust airstream (Stream C in Figure 2). The airstream leaving the system will have up to 50 percent of perc

vapors removed from it and is recirculated back to the dryer (Stream D in Figure 2) where it is reheated for reuse in the drying process. This results in a closed-loop system which eliminates virtually all perc emissions from the drying cycle. Since recirculation of dryer process air is now required by the EPA, facility owners have an economic incentive to ensure that their perc vapor recovery systems are operating as efficiently as possible. A recovery system that removes a large portion of perc vapors from the dryer exhaust airstream recycles purer, more effective air back to the dryer.

All new (as defined in Section 4.2) dry cleaning machines are now required to install refrigerated condensers as the main perc vapor recovery system to recover drying step emissions. Carbon adsorbers are also in use for existing machines. Both pieces of equipment produce a condensate consisting of a water/perc mixture which is then sent to the perc/water separation process. Refrigerated condensers and carbon adsorbers are both described in Section 3.6.

Residual Perc Vapor Recovery (recovery of aeration step emissions)

The dryer exhaust airstream after the drying cycle still contains residual perc vapors. However, since fresh air must be circulated throughout the system during the ensuring aeration step, this airstream cannot be recirculated to the dryer and must be vented to the atmosphere. Complete drying before aeration ensures that the perc vapors vented during this step are minimized.

A residual perc recovery system can be installed to remove the small amounts of perc contained within this airstream before it is vented. This residual perc recovery system recovers vapors from the aeration exhaust of the dry cleaning cycle (Stream A in Figure 2) and vents the exhaust to the atmosphere after one pass (Stream B in Figure 2). The perc/water mixture that is recovered is piped to the separation process. A diverter valve is installed in the dryer exhaust duct to switch the flow of air between the main and residual system as the dryer door is opened and closed.

Major sources of perc air emissions (as defined in Section 4.2) are required to install and operate carbon adsorbers to serve as residual perc vapor recovery systems. Refrigerated condensers do not have the ability to recover the small concentration of perc vapors typically found in the aeration exhaust. EPA does not require other sources to have residual perc recovery systems at this time—they may vent aeration vapors directly to the atmosphere. When transfer machines are eventually phased out, these emissions will be the only deliberate source of perc emitted to the atmosphere during the dry cleaning process (see washer open-door cycle perc vapor recovery, below).

Washer Open-Door Cycle Perc Vapor Recovery (recovery of transfer step emissions)

The perc-laden air in a transfer machine washer after the extraction step is vented away from the machine during the manual transfer of clothes (while the door is open) to protect the worker from perc fumes (Stream E). Like the airstream from the aeration step, this airstream also cannot be recirculated because fresh air is being drawn into the machine during this transfer step. Therefore, this airstream must be vented to the atmosphere (Stream F) after one pass through a control device.

The dryer exhaust and the washer open-door exhaust streams (Stream C and Stream E) cannot be served by the same coil because the washer exhaust is much cooler and requires a lower temperature coil (40 CFR 63.322(f)(3)). (The two coils can, however be contained with the same condenser unit.) In order to prevent air from passing through the condenser until the washer door is opened, an exhaust damper (see Figure 2) is generally installed in front of the inlet (Stream E). As with the other perc recovery processes, the condensed distillate is directed to the separation process.

Perc/Water Separation

The condensate from the distillation process, and from all three vapor recovery processes contain varying amounts of perc and water. In this step, the water is separated out in a gravity settling tank, leaving purified perc that is sent to the storage tank for reuse in the washing process. The water that is removed contains a small amount of perc (about 150 ppm) and is the

only source of contaminated wastewater from a typical dry cleaning plant. The separator unit is described in Section 3.6.

Wastewater Treatment

The perc content in separator water can be further reduced to between 0.1 to 0.7 ppm in a mister, which passes the separator water through a disposable carbon filter and then sprays the treated water into the atmosphere. There is no discharge of perc contaminated water to the municipal sewer in this case.

Additional Perc Recovery From Wastes

Contract disposal services have traditionally disposed of perc wastes in landfills. Due to tightening of Resource Conservation and Recovery Act (RCRA) regulations and increasing costs for disposal of hazardous wastes, it has become economical in many cases for contract disposal services to further recover perchloroethylene from still bottom and filter wastes and sell the recycled perc back to the dry cleaning industry. Specialized contractors can remove all but about 1000 ppm (by weight) of perchloroethylene from dry cleaning solid wastes.

3.6 Perc Recovery Equipment

Much of the accessory equipment in a dry cleaning plant is dedicated to the recovery and recycling of perc. The most common types of specialized equipment used in the dry cleaning industry are described below.

Filters (Process: Used Perc Filtration)

Main dry cleaning filters can be classified into three types: cartridge filters, disk filters, and powder filters. A polishing filter may follow the main filter for additional perc clarification.

Cartridge Filters

All cartridge filters contain some kind of disposable filter element. Most are cylindrical with a diameter of about 7¾" (20 cm) and a height of about 14¼" (36 cm). They are installed

in housings that hold anywhere from a single filter for small machines to 21 filters for larger capacity machines. The three types of cartridges commonly used are known as carbon core cartridges, all-carbon cartridges, and adsorptive cartridges.

Carbon core cartridges consist of a pleated paper element to remove insoluble soils and a center core of activated carbon to remove dyes (see **Figure 3**). **All-carbon cartridges** contain only activated carbon and are used for additional color removal. They are installed in a section of the filter housing after the carbon core cartridge. **Adsorptive cartridges** are similar to all-carbon cartridges but in addition to activated carbon, also contain some activated clay. Activated clay has different adsorptive characteristics—it is not as efficient at removing colors but can adsorb some types of non-volatile residues.

The gaskets used to install cartridges must be in good condition. Damaged gaskets or old gaskets that have hardened and are unable to seal properly will either leak or allow unfiltered perc to bypass the cartridge. Newly installed cartridges tend to allow some fine activated carbon particles to pass through the paper element and do not reach their full efficiency until a layer of soil (precoat) accumulates on the filter paper.

Filters need to be replaced when a certain amount of material accumulates on them. For some cartridges, manufacturers recommend that filters be replaced when the pressure difference across them reaches a certain level. Others should be replaced when a certain weight of filtered soils builds up inside the cartridge. Typically, a standard size cartridge should be replaced after filtering an amount of perc that has cleaned 800 to 1,500 pounds (360 to 680 kg) of clothes. Continued use of spent cartridges can result in rapid pressure increases that may force unfiltered perc through the system.

Accumulated solid filter waste must be treated to recover as much perc as possible before its disposal as a hazardous waste. Cartridge type filters produce spent cartridges which can be drained in their housing to minimize perc losses. Unfortunately, the machine cannot be operated while the filter is being drained. New cartridge filters have built-in stream stripping systems for maximum perc recovery.

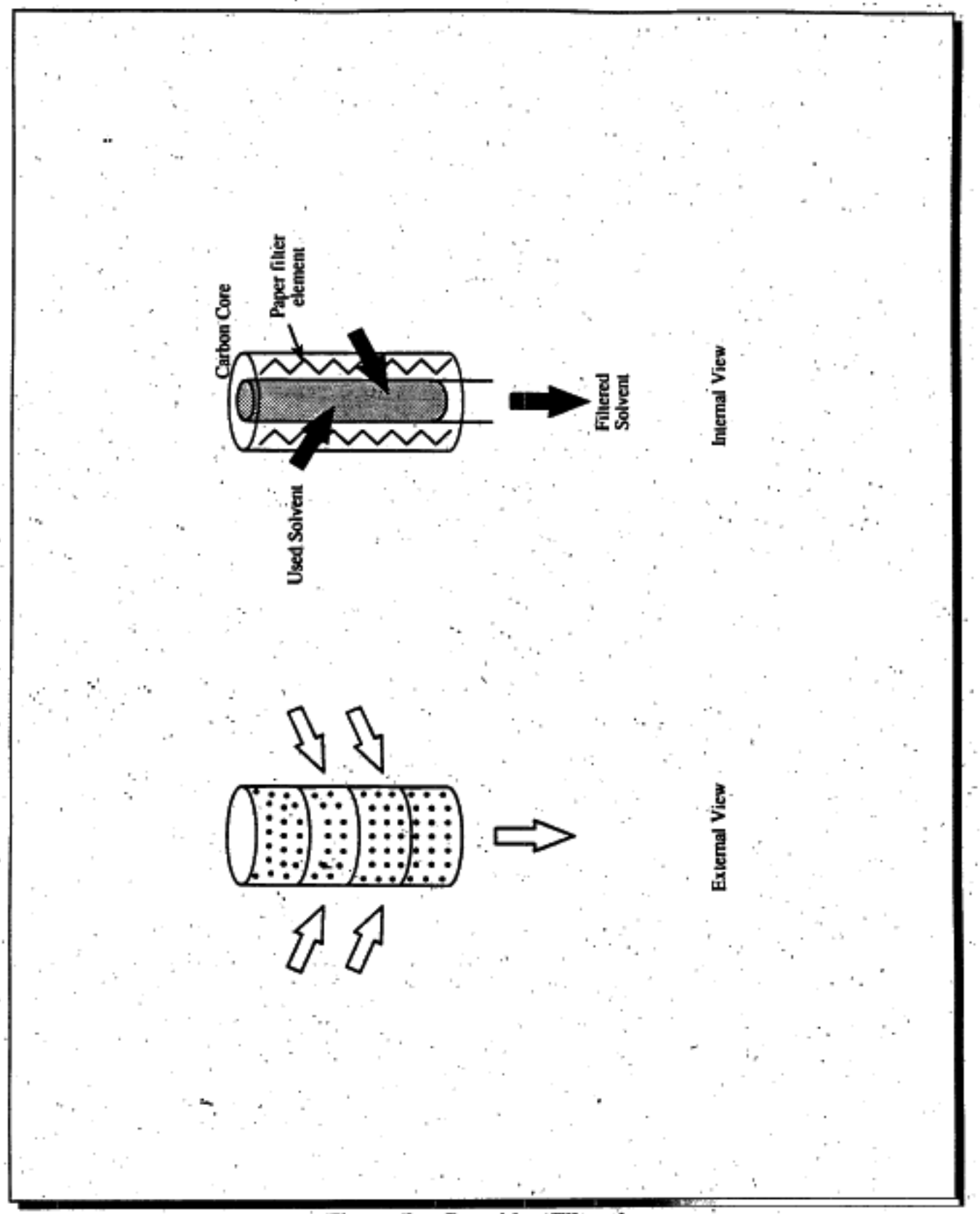


Figure 3. Cartridge Filtration

Disk Filters

Disk filters are becoming more common in new dry cleaning machines. The filter elements in these units are disk-shaped, reusable fabric filters with a pore size of approximately 25 to 30 microns. A single disk filter unit can be a cylindrical unit containing up to 40 or 50 filter elements. Disk filter units can be used with or without diatomaceous earth (see Powder Filters) and have a built in centrifuge motor. When a certain weight of filtered soils builds up on the disks, the entire unit is centrifuged, driving the filtered soils to the outside of the cylinder. The filtered material can then be removed and further treated before disposal as hazardous waste, while the filter disks remain in the unit to be reused. Disk filters are becoming more common primarily because they do not require disposal of bulky cartridge units. Only the filtered material, along with some diatomaceous earth, if any is used, requires disposal. This can result in significant savings in waste disposal costs for the typical dry cleaning facility.

Powder Filters

Although cartridge and disk filters are used almost exclusively today, powder filters are still encountered occasionally. These filters use a powder consisting primarily of diatomaceous earth (or diatomite), which has the tendency to form a porous cake when wetted. For each washer cycle, the diatomite filtration cycle consists of three steps: (1) precoat, (2) filtration, and (3) removal of the filter cake (see **Figure 4**).

To apply the precoat, diatomite is added to clean perc which is then pumped through some sort of support material, such as a metal screen. The thin layer of diatomite that is deposited on the support is the precoat, or base of the filter cake. Once the precoat has accumulated, the filter can begin to process used perc. The used perc that is pumped through the filter contains additional diatomite to dilute the soil that accumulates on the filter so that the cake maintains its porosity.

Non-regenerative filters are usually only precoated at the beginning of each work day and fresh filter powder, known as body feed, is added at the beginning of each filtration cycle.

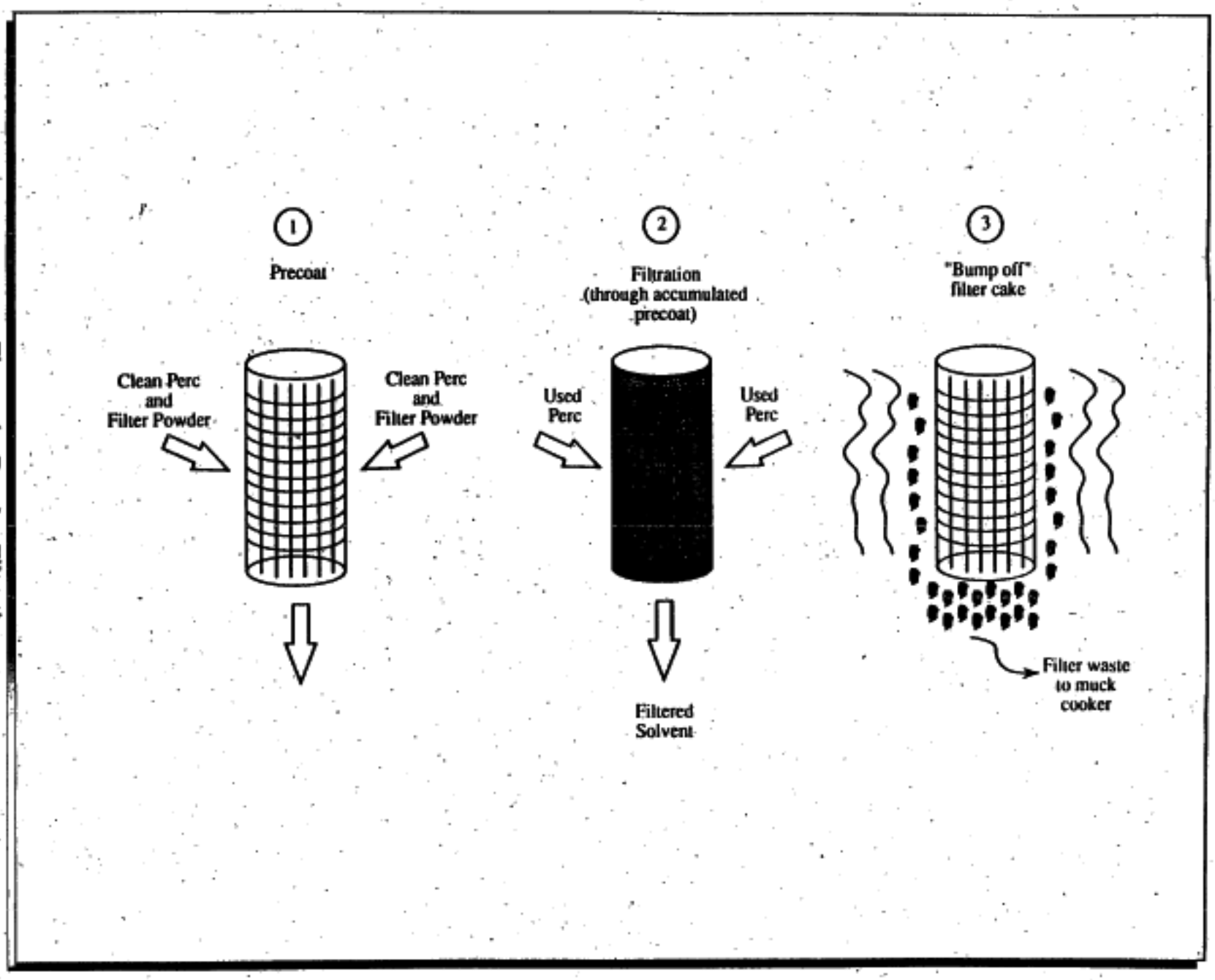


Figure 4. Powder Filtration

At the end of the day, when the filter cake reaches a certain thickness and causes excessive filter pressures, the entire cake is dislodged, removed and discarded. In a **regenerative filter**, a larger initial pool of fresh filter powder is added to the machine at the beginning of the day. At the beginning of each cycle, filter powder is drawn from this pool to form the precoat. After each filtration cycle. the filter cake along with the embedded soils, is bumped off and returned to and mixed into the pool. In this process, a new precoat must be formed prior to each filtration cycle. Filter powder must be pumped for about 2 minutes through the support before formation of a precoat with adequate coverage.

The material used to support the diatomite varies from filter to filter. Bag filters and screen filters support the diatomite on bags and screens, respectively, and the filter cake is manually dislodged from these supports. Rigid tube filters, an advance in filter technology, support the filter powder on an internal wire frame surrounded by a filter screen; a back-wash of reverse perc flow is used to remove the filter cake from the tube. All of these filters operate as non-regenerative filters and will rarely, if ever, be encountered today.

Regenerative tube filters are still used in some dry cleaning facilities. These are constructed of flexible braided metal wire, metal helical springs, or braided or knit fibers, from which the filter cake can easily be dislodged at the end of each cycle. The advantage of regenerative filters is that they do not require body feed addition and the filter cake does not build up significant thickness, so that more soils can be collected by a given amount of diatomite before it must be discarded.

To remove color and non-volatile residues, activated carbon and activated clays can be mixed into the filter powder. These materials do not form a porous cake like diatomite and should be added after the precoat has formed if possible, to prevent excessive build-up of filter pressure.

Polishing Filters

In addition to the cartridge or powder filters that are used as the main filter, an additional polishing filter may be installed to remove trace amounts of insolubles from the clarified perc. Two popular types are those constructed with resin-bonded fibers and those consisting of a spiral cotton element wound onto a perforated metal tube. Polishing filters are extremely fine and have pore sizes of approximately 3 to 5 microns. In order to increase their useful life, they should be bypassed during the precoat process for powder filters, or after installation of new cartridges for cartridge filters.

Muck Cooker (Process: Used Perc Filtration)

The spent filter cake removed from a powder filter is saturated with perc and must be treated before disposal. This filter muck, as it is called, is transferred to a muck cooker, where it is cooked to vaporize the perc. The vapors are routed through a condenser to recover the perc for reuse. This process can recover up to 90 percent of perchloroethylene from the filter muck. In some facilities, the distillation unit will also serve as a muck cooker. Other facilities may have a separate unit.

Distillation Unit (Process: Perc Distillation)

The distillation process removes non-volatile residues (soluble oil, grease and other impurities) from the perc that cannot be removed by the filtration process. Filtered perc is distilled by heating it with steam coils in an atmospheric pressure still kettle (see **Figure 5**). At a temperature of 250°F (121°C), the perc and water are vaporized while soluble impurities remain at the bottom of the still.

The vapor mixture is piped to a condenser to be cooled back to a liquid state. The condenser contains coils filled with continuously recirculated cooling water which runs counter-current to the motion of the vapor mixture. In order to achieve proper condensation, the mixture should be cooled to about 90°F (32°C), which requires that the temperature of the

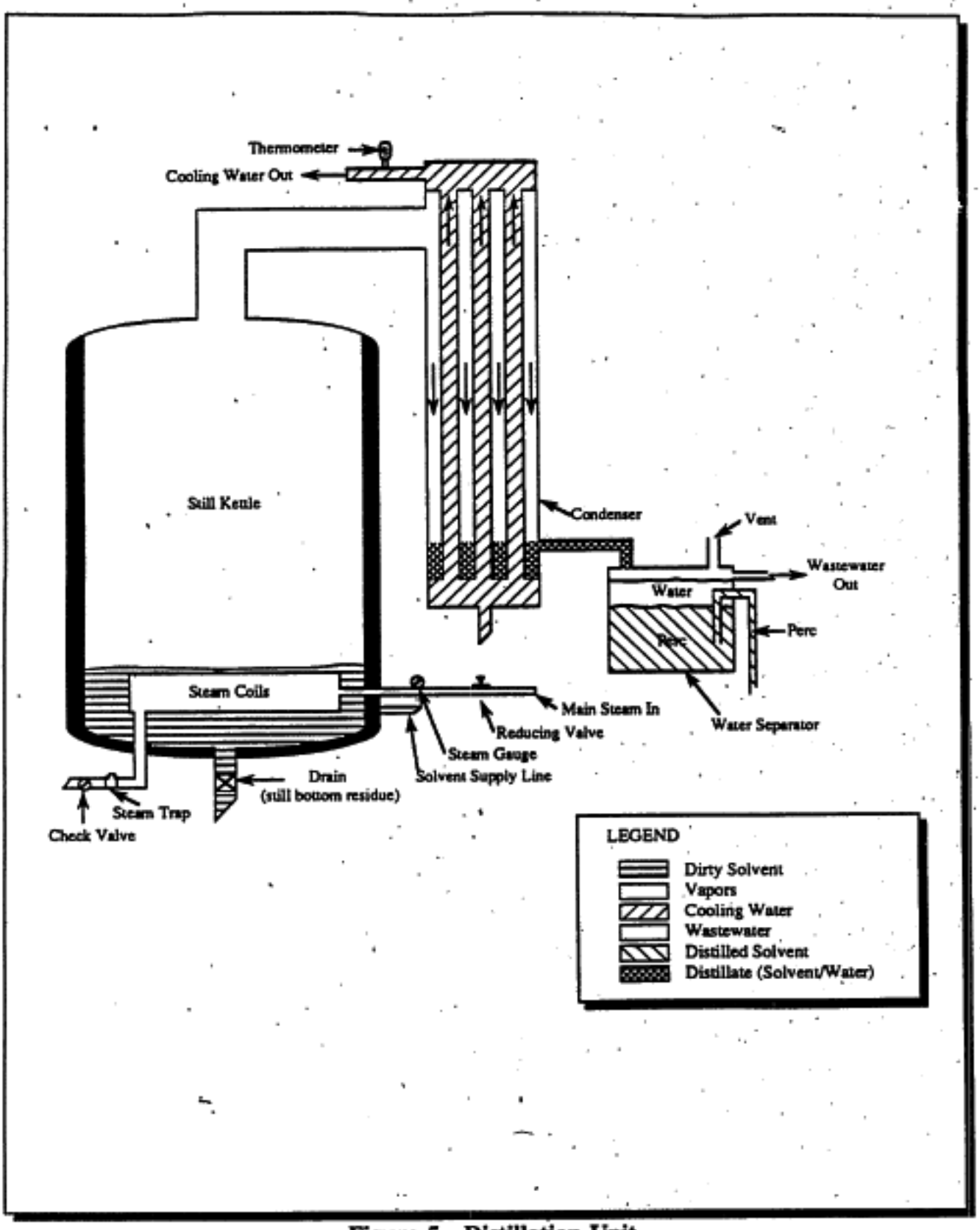


Figure 5. Distillation Unit

cooling water leaving the condenser be close to 110°F (43°C). The perc and water vapors condense onto the condenser coils, drip down to a collection point, and the condensate is piped to the separator.

The oils and greases remaining at the bottom of the still when the used perc is vaporized are collectively known as still bottom residue. Still bottom residue must be drained periodically from the bottom of the still kettle. This residue is hauled manually in a bucket to the satellite waste disposal container.

Emissions Control Devices (Processes: Perc Vapor Recovery Processes)

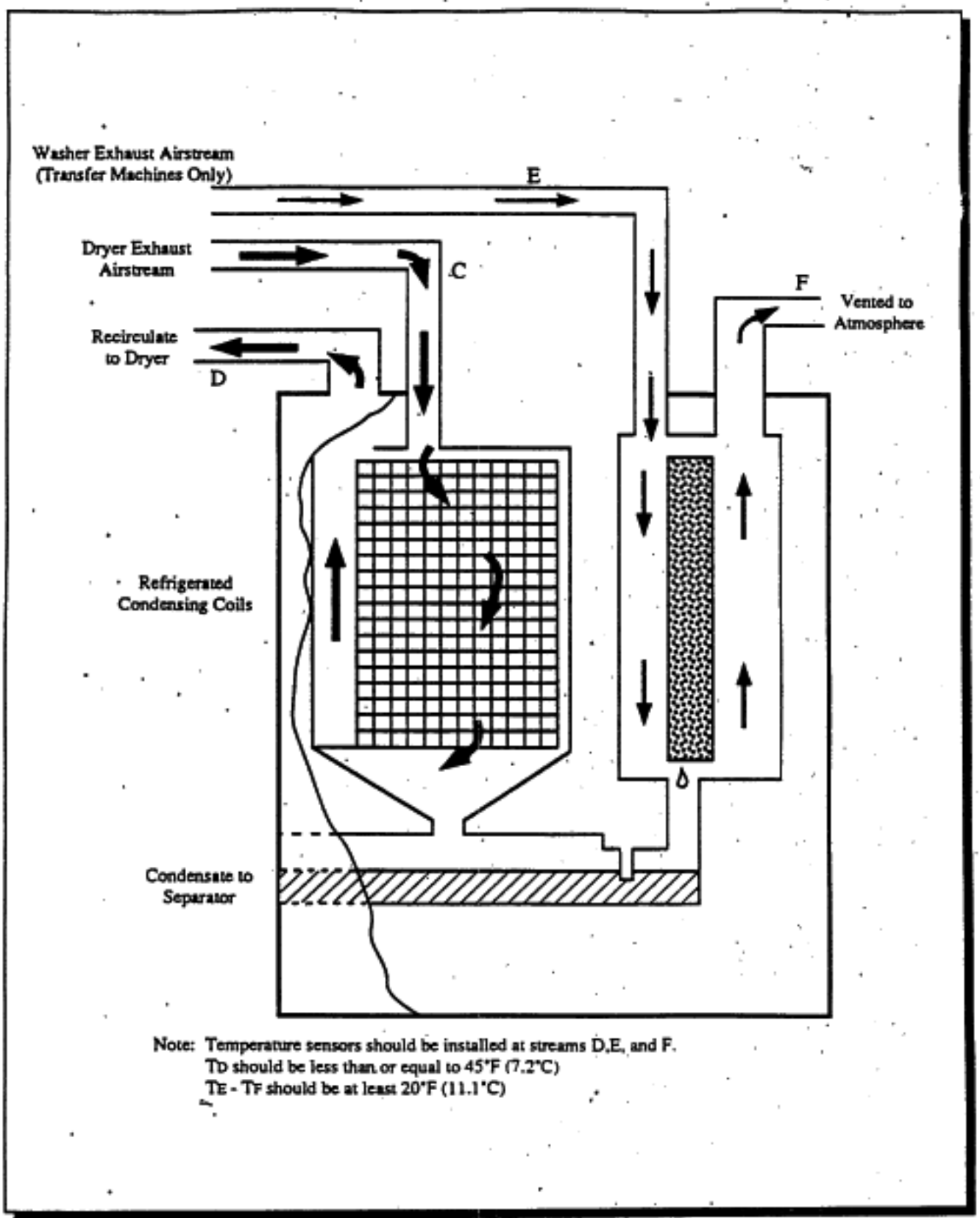
The two types of emissions control devices widely in use today are the refrigerated condenser and the carbon adsorber.

Refrigerated Condenser (Figure 6)

This device is similar to the condenser used to condense distillation vapors, but is designed to operate at a lower temperature for more complete removal of perc vapors. To recover perc vapors, the perc-laden airstream is passed over a matrix of refrigerated coils, which cools the airstream to the point where the perc vapors condense onto the coils. The condensed perc drips down to a collection point and is piped back to be reused.

The performance of refrigerated condensers used to control dryer process emissions must be monitored with a temperature sensor installed in the outlet airstream that is recirculated back to the dryer (Stream D in Figure 6). Under current EPA regulations, the temperature of the air at this point must be 45°F or less during the drying process to be removing an adequate portion of perc vapors from the dryer exhaust airstream.

Refrigerated condensers serving to remove washer open-door cycle vapors must also be monitored for performance. Two additional temperature sensors must be installed on the inlet (Stream E in Figure 6) and outlet (Stream F in Figure 6) of the exhaust from the washer. Under current EPA regulations, the net temperature drop of the airstream across the condenser must



Note: Temperature sensors should be installed at streams D,E, and F.
T_D should be less than or equal to 45°F (7.2°C)
$T_E - T_F$ should be at least 20°F (11.1°C)

Figure 6. Perc Recovery System: Refrigerated Condenser

be at least 20°F (11.1°C) to remove an adequate portion of perc vapors.

Carbon Adsorber (Figure 7)

The carbon adsorber is another type of perc vapor recovery device. While refrigerated condensers continuously remove perc vapors from an airstream and recycle it back to the system as liquid perc, carbon adsorbers trap vapors in an activated carbon bed. The outlet airstream is continuously piped to the atmosphere or back to the dryer depending on whether the adsorber is used to recycle residual or main vapors. However, the collected perc is only returned to the system during a periodic WP process. In the process of , the carbon bed is also regenerated and can be reused.

Activated carbon is a manmade loose granular material which has a high affinity for adsorbing organic compounds. The perc-laden airstream is passed through a bed of activated carbon and the perc molecules are adsorbed on the large surface area of the carbon material. Removal rates for carbon adsorbers are over 95 percent. Unlike a filter which simply loses efficiency when it is not properly serviced, an adsorptive bed becomes entirely ineffective when it reaches its capacity. In essence, all the adsorptive spaces on the surface area of the activated carbon have been occupied and the bed ceases to adsorb any more perc vapors. A typical carbon bed can adsorb about 20 percent of its own weight in perc vapors before it reaches its capacity and needs to be regenerated.

Desorption of the accumulated perc and regeneration of the carbon bed is accomplished through a steam stripping process (see Figure 7). This process consists of passing steam through the bed to vaporize the perc molecules and separate them from the carbon. The combined vapor stream of perc and steam is then condensed and routed to the separator. Dry cleaning facilities are required to regenerate their adsorbers at least on a weekly basis, but the actual length of the adsorption/desorption cycle should be determined by monitoring the perc concentration in the outlet airstream during the last run before desorption.

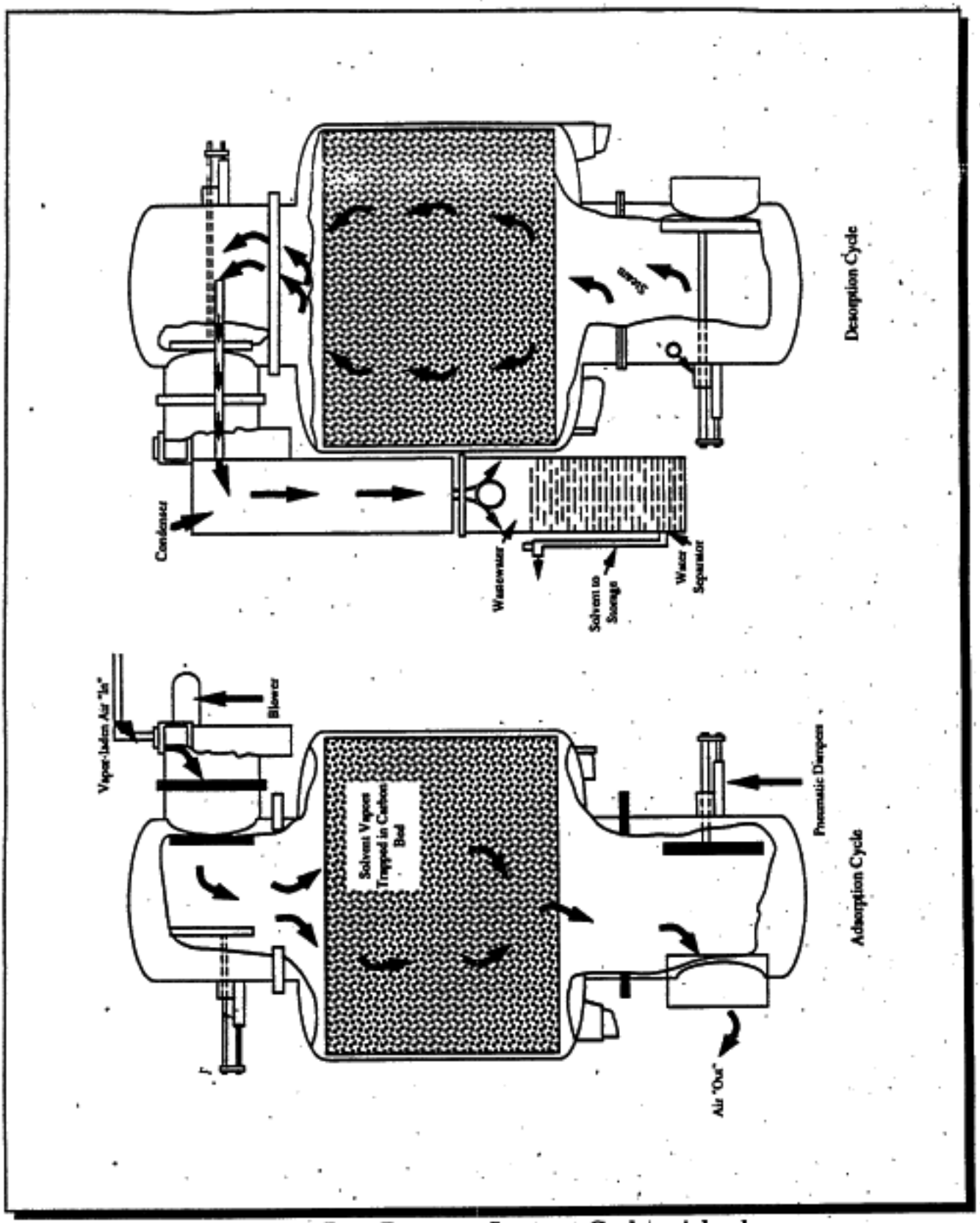


Figure 7. Perc Recovery System: Carbon Adsorber

Monitoring of carbon adsorbers is accomplished with a colorimetric detector tube (see **Figure 8**). This tube contains a chemical substance that, when exposed to the adsorber exhaust, changes colors depending on the perc vapor concentration. Each tube can only be used once. Some tubes are operated with a hand bellows pump that must be squeezed several times. Use of tubes requires that a sampling port (usually ½") be drilled in the outlet duct of the adsorber. Colorimetric detector tubes are calibrated to measure perc concentrations up to 300 ppm to an accuracy of ±25 ppm.

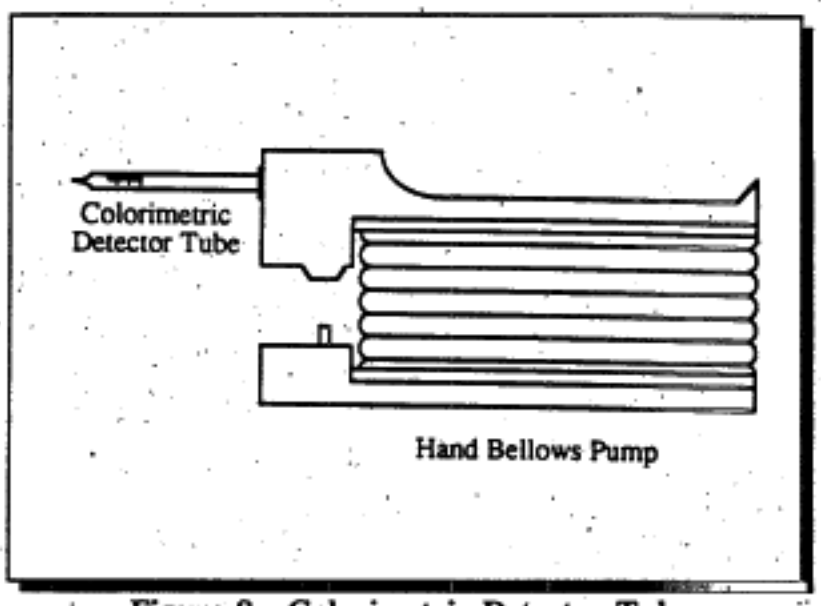


Figure 8. Colorimetric Detector Tube

The sampling port must be located in a straight portion of duct without flow disturbances in order to obtain accurate test results. Specific EPA requirements regarding location of sampling ports are covered under the summary of air regulations (Section 4.3.2).

Use of Refrigerated Condensers and Carbon Adsorbers

EPA regulations have prohibited further installation of carbon adsorbers used as main perc recovery systems, mainly because of the potential for human error—carbon adsorbers

become entirely ineffective if they are not regenerated in a timely manner. They also have other disadvantages that discourage their use as main perc recovery systems. They are mechanically more complex than refrigerated condensers and require more labor for maintenance and operation. Furthermore, although the carbon bed can be regenerated repeatedly for up to 20 years, it eventually becomes spent and must be disposed of as solid waste.

Carbon adsorbers do have two advantages over refrigerated condensers. One is their ability to remove perc vapors from airstreams with considerably lower concentrations of perc, which makes them appropriate for use as residual vapor recovery systems and for controlling fugitive emissions (e.g., from transfer machine room enclosures). They are also able to handle higher airflows, which in the past accounted for their higher usage in the industrial dry cleaning sector.

Separator (Process: Perc/Water Separation)

Condensed perc from any condensation process will normally have a certain amount of water that must be removed. The separator is simply a settling tank in which a purified mixture of water and perc from the various condensers in the dry cleaning plant can be separated by gravity (see **Figure 9**). Liquid perc is considerably heavier than water (with a specific gravity of 1.62) and will settle to the bottom of the tank, while a water layer will remain at the top. The separated purified perc is piped to the solvent storage tank for reuse in the dry cleaning cycle. Management of the remaining wastewater is discussed in Section 3.7.

Mister (Process: Wastewater Treatment)

The mister contains a disposable activated carbon filter that removes residual perc from separator water. The treated water contains as little as 0.1 to 0.7 ppm perc and is sprayed into the atmosphere. Dry cleaning facilities that choose to incorporate a mister into their perc recovery process should regularly replace the carbon filter as per manufacturer's instructions. Continued use of spent filters could result in untreated separator water being sprayed into the atmosphere.

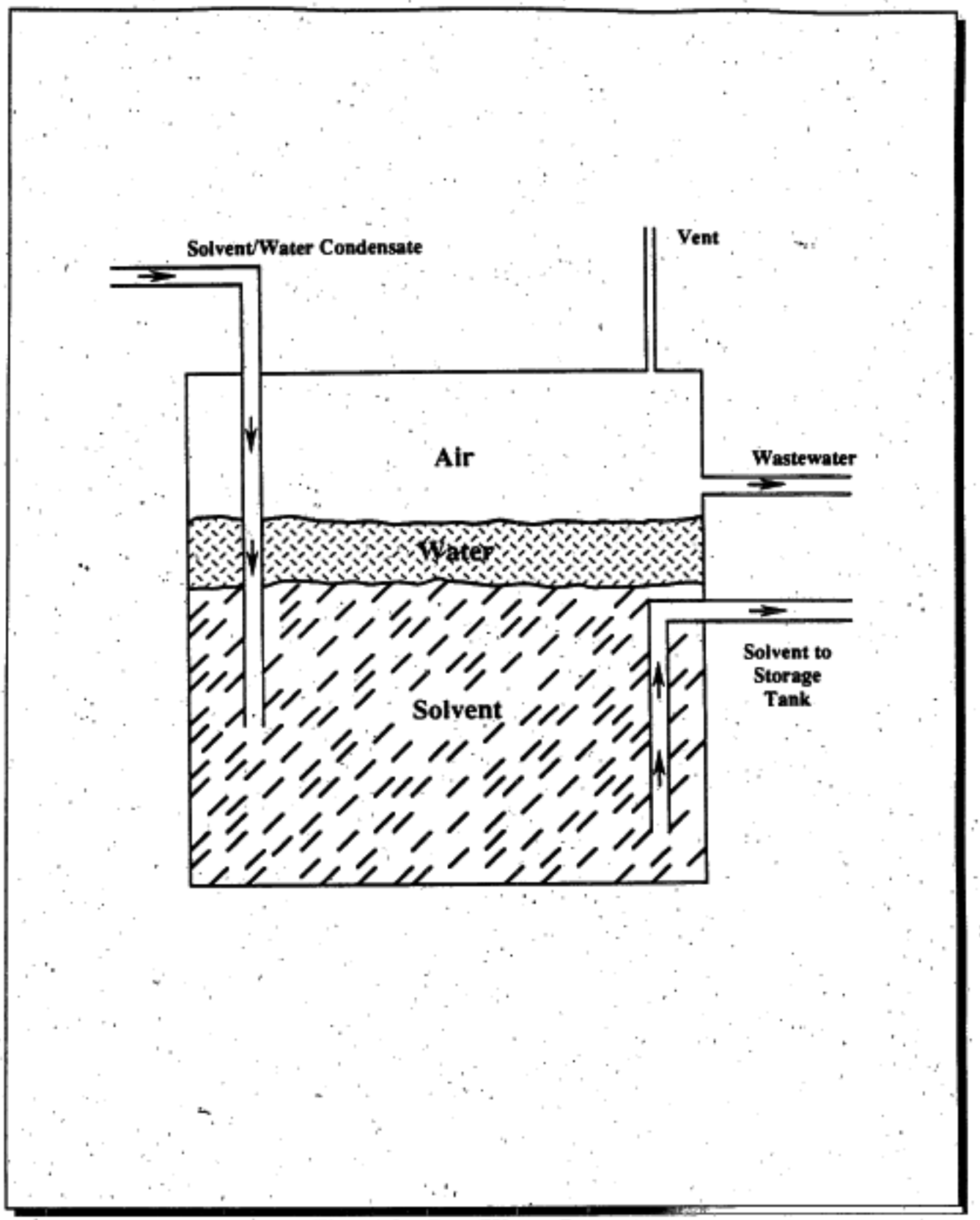


Figure 9. Perc/Water Separator

Evaporator (Process: Wastewater Treatment)

An evaporator unit contains a heating device to vaporize the separator water into the atmosphere. Evaporators may be appropriate for larger facilities that generate substantial amounts of separator water. EPA has determined that facilities that choose this method of handling separator water do not need to obtain a permit for hazardous waste treatment. Dry cleaners should check to ensure that evaporators are allowed under state and local environmental regulations as well.

3.7 Summary of Perc Waste Sources

The various wastes that are produced during the dry cleaning process have been identified in the discussion on dry cleaning processes and equipment (Sections 3.1 to 3.6). In this section they are summarized for the convenience of the inspector.

Air Emissions

- **Residual vapors vented during the aeration process.** These may be vented either directly to the atmosphere or through a carbon adsorber, depending on the applicable requirements. If a carbon adsorber is used, the outlet airstream released to the atmosphere must not exceed 100 ppm perc when the machine door is open and must not exceed 300 ppm perc when the machine door is closed.

- **Open door cycle vapors that escape the recovery process in the refrigerated condenser.** These emissions will be minimized if the condenser is in compliance with monitoring requirements for refrigerated condensers.

- **Room enclosure vapors.** Vented through a carbon adsorber by room enclosures for transfer machines.

Hazardous Wastes

- **Still bottom residues.** The residue remaining at the bottom of a still must be drained and disposed of. About 25 pounds of still residue will be produced for each 1000 pounds of clothes cleaned.

- **Drained (and/or steam-stripped) spent cartridges.** Machines that have cartridge filters and drain them properly before disposal can expect to produce about 20 pounds in spent carbon core cartridges for every 1,000 pounds of clothes cleaned. More

cartridges will be generated if all-carbon cartridges are used for additional color removal.

- **Cooked powder residue.** If powder filters are used, the filter cake is cooked in a muck cooker to remove remaining liquid perc. The residue, consisting of diametaceous earth and insoluble soils removed from the used perc, still contains some residual perc and is a solid hazardous waste. A machine using a powder filter can expect to generate about 40 pounds of cooked powder residue for every 1,000 pounds of clothes cleaned.

- **Spent activated carbon.** Although the carbon in carbon beds can be regenerated repeatedly, it will gradually lose its effectiveness and will eventually need to be replaced. The carbon will contain perc and is a solid hazardous waste. The amount generated is fairly insignificant, since a carbon bed can be regenerated for approximately 20 years.

- **Button trap wastes and lint trap wastes.** Materials trapped in these screens should be handled as hazardous waste.

Wastewater

- **Separator water.** This is the portion of the water/perc mixture from various condensing process in the plant that rises to the top of the water separator. It consists of water that is saturated with perc, which is soluble in water to about 150 ppm. This water can usually be disposed of as hazardous waste or treated in a mister or an evaporator. Disposal of untreated separator water into on-site disposal systems such as dry wells, cesspools, and septic tanks is prohibited. Disposal to a municipal sewer system is subject to State and local POTW requirements.

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CHAPTER 4

EPA AIR REGULATIONS APPLYING TO DRY CLEANERS

4.1 Background

The Clean Air Act, as amended in 1990, set the framework for EPA regulation of 189 newly identified hazardous air pollutants, one of which is perchloroethylene. Section 112 of the Clean Air Act required EPA to control emissions of these hazardous air pollutants (HAPs) by promulgating national emissions standards for each category of sources that is found to emit HAPs. These standards are found in Section 63 of Title 40 of the Code of Federal Regulations and are known as the National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Source Categories. Specific standards for the perc dry cleaning industry were promulgated on September 23, 1993, in the Federal Register (58 FR 49354) as the National Perchloroethylene Air Emission Standards for Dry Cleaning Facilities (Subpart M of 40 CFR Part 63).

These NESHAP regulations for dry cleaners are technology-based, rather than emissions-based. Because it would have been prohibitively burdensome to require owners to constantly monitor emission concentrations and solvent mileage, the EPA decided that, as authorized under section 112(h) of the CAA, the standards would require installation of certain levels of emissions control equipment combined with mandatory performance testing to ensure that the equipment is functioning properly. NESHAP standards for dry cleaners are intended to control emissions from major sources (defined by Section 112 as having the potential to emit more than 10 tons per year of PCE) to a level that is represented by maximum achievable control technology (MACT). Area sources (non-major sources) are required in the framework of these regulations to control their emissions to a level that is represented by generally available control technologies (GACT).

4.2 Applicability

Dry cleaning facilities are categorized into four size categories for the purposes of regulation. These are, from smallest to largest: coin-operated facilities, small area sources, large area sources, and major sources.

- **Coin-operated dry cleaners** are defined as those facilities that have only dry cleaning machines that are operated by the customer.

Classification in the other size categories is determined by the type of machines (dry-to-dry or transfer) in use and by the amount of perc purchased each year.

- **Small area sources** are those that (1) have only transfer machines and purchase less than 200 gallons (760 liters) per year of perc or (2) have only dry-to-dry machines or have both transfer and dry-to-dry machines, and purchase less than 140 gallons (530 liters) per year of perc (40 CFR 63.320(d),(e)).

- **Large area sources** are those that exceed perc purchase levels for small area sources but do not purchase enough to be classified as a major source.

- **Major sources** are those that (1) have only dry-to-dry machines and purchase more than 2,100 gallons (8,000 liters) of perc per year or (2) have only transfer machines or have both transfer and dry-to-dry machines, and purchase more than 1,800 gallons (6,800 liters) of perc per year (40 CFR 63.320(g)).

Requirements for size categories are summarized in **Table 2**.

Table 2. Size Category Determination for Applicability of Air Regulations

Facility Size Category	Transfer Machines Only	Dry-to-Dry Machines Only	Both Transfer and Dry-to-Dry Machines
Coin-operated source	n/a	Has only customer operated machines	n/a
Small area source	Perc purchases < 200 gal/yr	Perc purchases < 140 gal/yr	Perc purchases < 140 gal/yr
Large area source	Perc purchase 200 - 1,800 gal/yr	Perc purchases 140 - 2,100 gal/yr	Perc purchases 140 - 1,800 gal/yr
Major source	Perc purchases > 1,800 gal/yr	Perc purchases > 2,100 gal/yr	Perc purchase > 1,800 gal/yr

In addition to classifying each facility by size, each individual machine is also regulated differently under NESHAP regulations depending on whether it is a new machine or an existing machine. **New machines** are regulated more stringently and are defined in the context of these

regulations as those installed on or after December 9, 1991. **Existing machines** are those that were installed before this date (40 CFR 63.321).

4.3 Requirements

The applicability of NESHAP requirements is dependent on the size category of the facility. Coin-operated facilities are exempt from all NESHAP regulations (40 CFR 63.320(j)). With regard to the three remaining size categories, requirements involving installation of equipment are generally more stringent for larger facilities. The intent is to avoid unduly burdening small businesses with requirements they cannot afford to meet. On the other hand, requirements involving little or no capital investment (e.g., monitoring and recordkeeping) have been standardized for all dry cleaners regardless of size.

Requirements can be divided into four categories:

- Equipment requirements (intended to eliminate major sources of perc emissions)
- Emissions equipment monitoring (tests to ensure that the control devices are operating properly)
- Fugitive emissions control (prevention of miscellaneous perc emissions resulting from leaks, improper operation of dry cleaning machines, or improper handling of perc and perc wastes)
- Recordkeeping and reporting (demonstration of compliance).

A summary of all EPA air requirements applying to dry cleaners is provided in **Table 3.**

4.3.1 Installation of Emissions Control Equipment

The two largest potential sources of air emissions from the dry cleaning industry are (1) the release of perc vapors into the atmosphere during transfer of clothes from the washer to the dryer and (2) the venting of the dryer exhaust airstream. To eliminate these sources of air pollution, EPA regulations are phasing out the use of transfer machines and phasing in requirements on the installation of control devices for dryer exhaust airstreams.

Table 3. EPA Air Requirements for Dry Cleaners

Requirement	Size Category of Dry Cleaning Facility		
	Small Area Source	Large Area Source	Major Source
Equipment Requirements			
Elimination of all transfer machines classified as new	Required		
Surround all existing transfer machines with room enclosure vented by carbon adsorber	Not required	Not required	Required by 9/23/96.
Installation of main perc vapor recovery system (refrigerated condenser or carbon adsorber)[1]	Required for new machines upon start-up. Not required for existing machines	Required for new machines upon start-up. Must be installed for existing machines by 9/23/96.	Required for new machines upon start-up. Must be installed for existing machines by 9/23/96.
Installation of additional carbon adsorber for residual perc recovery system	Not required	Not required	Required for new machines upon startup, for existing machines by 9/23/96.
Emissions Equipment Monitoring			
Monitoring of refrigerated condensers	Weekly monitoring required		
Monitoring of carbon adsorbers	Weekly monitoring required		
Fugitive Emissions Control			
Leak detection program	Biweekly inspection	Weekly inspection	Weekly inspection
Simple leak repairs	Repair within 24 hours		
Leak repairs requiring order of parts	Order parts within 2 working days. Install parts within 5 days of receipt.		
Disposal of cartridge filters	Drain for at least 24 hours		
General operation of dry cleaning machines	As per manufacturer's specifications and recommendations		
Keep machine doors closed except when transferring clothes	Required		
Store perc and perc waste storage in tightly sealed containers	Required		
Reporting			
Initial compliance report	Required upon startup.		
Additional compliance reports	Required 30 days after startup and after any change in facility status.[a]		
Recordkeeping			
Facility Log Book	Maintain on-site for 5 years.		

[1]Perc vapor recovery systems should be refrigerated condensers, or alternatively, existing carbon adsorbers installed before September 22, 1993.

[a]Change in facility status includes a change in ownership or address of the facility, purchase of new equipment, or a change in size category.

The specific requirements enacted to achieve these two key process changes in the dry cleaning industry are intended to regulate major sources under maximum achievable control technology (MACT) standards. Large and small area sources are to be regulated under generally available control technologies (GACT).

Phase-Out of Transfer Machines

For new dry cleaning systems, **all** emissions of perc vapors to the atmosphere must be eliminated from the transfer step. Since no technology has been devised to date that can accomplish 100 percent elimination of all vapors during the transfer of clothes from the washer to the dryer, this requirement has effectively forbidden the operation of any transfer machines classified as new (40 CFR 63.322(b)(2)).

Existing transfer machines are allowed. However, if they are located at a major source, they must be surrounded with a room enclosure to protect workers from fugitive perc vapors (40 CFR 63.322(a)(3)). This enclosure must be impermeable to perchloroethylene and designed and operated to maintain a negative pressure inside at all times that the machine is operating to ensure that all perc vapors are being vented. The air inside the enclosure must be vented outside the plant through an additional carbon adsorber separate from any adsorbers used to control process emissions (40 CFR 63.322(h)).

Control Device Requirements

The primary method of controlling emissions is to install a control device to remove perc vapors from process emissions and recover them for reuse as a cleaning solvent. The two control devices that are widely in use today are the refrigerated condenser and the carbon adsorber. Current regulations include control devices used for three purposes:

- Main perc vapor recovery system: removes perc vapors in the dryer exhaust during the drying process and recycles the airstream back to the dryer
- Residual perc vapor recovery system: removes perc vapors from the air remaining in the system at the end of the drying cycle before it is vented to the atmosphere

- Washer open-door cycle vapor recovery system: removes perc vapors from the air vented during the clothes transfer process transfer machines
- Room enclosure emissions control: removes perc vapors from the air inside a room enclosure for transfer machines before it is vented to the atmosphere.

Regulations governing the installation of control devices for these purposes are detailed below.

Main Perc Vapor Recovery System (40 CFR 63.322(a))

Vapors from the drying stage are circulated through this recovery system repeatedly and vapors from the open door cycle of the washing machine are passed through the control device once before venting to the atmosphere. A refrigerated condenser should be used as the control device for a perc vapor recovery system. Carbon adsorbers installed before September 22, 1993, are also acceptable.

Small area sources are required to install a control device for each new machine upon startup but are not required to install such devices for existing machines.

Large area and major sources are required to install a control device for each new machine upon startup and are also required to outfit each existing machine with a control device by September 23, 1996.

Residual Perc Vapor Recovery System (40 CFR 63.322(b)(3))

Major sources are further required to vent residual dryer vapors through an additional carbon adsorber immediately before or as the door is opened. The refrigerated condenser system installed to remove and recovery perc vapors does not control the residual vapors remaining in the system at the end of the drying cycle. The additional adsorber is required for new machines upon startup. It is not required for existing machines. This requirement does not apply to facilities classified as small or large area sources.

Washer Open-Door Vapor Recovery System (40 CFR 63.322(f)(1))

The main recovery system usually doubles to recover washer open-door cycle vapors as well, although the airstreams are not mixed. This is required for all existing transfer machines by September 23, 1996. New transfer machines will no longer be permitted.

Room Enclosure Emissions Control (40 CFR 63.322(h))

As covered above in the transfer machine phase-out section, each room enclosure built to contain existing transfer machines must be vented through a separate carbon adsorber by September 23, 1996. Both the room enclosure and the accessory carbon adsorber are required only for major sources.

Requirements Concerning Use of Refrigerated Condensers

Refrigerated condensers used as main perc vapor recovery systems should be installed and operated under the following guidelines:

- Condensers must be installed to recycle the dryer airstream back to the dryer while the drying cycle is on (40 CFR 63.322(e)(1)).
- The inlet airstream coming from the dryer exhaust must be operated with a diverter valve, which must prevent flow through the condenser while the dryer door is open. This air flow will instead be directed to either an additional carbon adsorber or vented directly to the atmosphere. Only when the dryer door is closed can the condenser outlet airstream be recycled back to the dryer (40 CFR 63.322(e)(3)).
- As explained in Section 3.5 (Washer Open-Door Cycle Perc Vapor Recovery), the airstreams from the washer and the dryer of a transfer machine cannot be cooled by the same refrigerator coils (40 CFR 63.322(f)(3)).
- For transfer machines, the washer airstream should not be flowing through the condenser until the washer door is opened. An exhaust damper is usually installed to accomplish this purpose (40 CFR 63.322(f)(1)).

Requirements Concerning Use of Carbon Adsorbers

Carbon adsorbers are required to be installed in such a way that they are not bypassed at any time (40 CFR 63.322(g)(1)). For those adsorbers used to vent residual perc vapors, this requires that, practically speaking, they be hooked up in parallel with the main perc recovery system. Otherwise, if the two devices are hooked up in series (one after the other), the adsorber will accumulate dryer process vapors as well as residual vapors and will need constant desorption. An exhaust damper is normally used to prevent the dryer airstream from entering the adsorber until ambient air is drawn into the dryer.

4.3.2 Emissions Control Equipment Monitoring

Weekly monitoring is required for all emissions control devices to ensure that they are functioning properly and all testing results should be recorded in a facility log book.

Monitoring of Refrigerated Condensers (40 CFR 63.323(a))

Emissions from refrigerated condensers are monitored to confirm that the airstream is being cooled to a sufficient degree to condense the perc vapors. This is done by checking the temperature of the airstream(s) passing through the condenser with a temperature sensor. The temperature on the outlet end of the dryer airstream (Stream D in Figure 6) must be less than or equal to 45°F (7.2°C). Condensers serving transfer machines have an additional washer airstream. This airstream must be checked on both the inlet and outlet side (Stream E and F in Figure 6). The **net temperature drop** of the airstream as it passes through the condenser must be at least 20°F (11.1°C).

The temperature sensor that is used must be designed to measure a range of at least 32°F (0°C) to 120°F (48.9°C) and must be accurate to ±2°F (±1.1°C).

Monitoring of Carbon adsorbers (40 CFR 63.323(b))

Carbon adsorbers must be desorbed weekly to remove accumulated perchloroethylene. A carbon adsorber is virtually useless after it reaches its adsorption capacity. Emissions are

monitored simply by measuring the concentration of perc vapors in the outlet airstream with a colorimetric detector tube accurate to ±25 parts per million (ppm). The perc content in the outlet airstream of carbon adsorbers used to recover dryer process vapors (main recovery) must be less than or equal to 100 ppm. The outlet in an adsorber used to recover aeration process vapors (residual recovery) may not exceed 100 ppm after the machine door is opened, but may be as high as 300 ppm while the door is still closed. If the concentration of perc exceeds these amounts and the equipment is functioning properly, the adsorber must be desorbed on a more frequent basis.

Use of a colorimetric detector tube requires that a sampling port hole be drilled in the air ducts at the point where concentration readings are to be taken. This sampling port must be drilled at least 8 duct diameters downstream and at least 2 duct diameters upstream from any flow disturbance. (Example: If the duct diameters is 3 inches, then the sampling port hole must be drilled at least 30 inches downstream and at least 6 inches upstream of any flow disturbance.) A flow disturbance includes any of the following:

- The inlet or outlet of the duct
- A bend in the duct
- A contraction or expansion
- A place where another duct is piped in or out.

The sampling port should be kept covered when not being used for testing.

Testing should take place at the end of the periodic adsorption cycle, during the last dry cleaning cycle before the adsorber is desorbed. The machine should be venting to that carbon adsorber while the test is conducted.

4.3.3 Fugitive Emissions Control

Leak Detection and Repair Program (40 CFR 63.322(k),(l),(m),(n))

Dry cleaning facilities are required to conduct periodic inspections to check for leaks in each dry cleaning machine. Inspections must be conducted weekly at large and major sources and biweekly at small sources and must include the following components of each dry cleaning machine:

- Hose and pipe connections, fittings, couplings, and valves
- Door gaskets and seatings
- Filter gaskets and seatings
- Pumps
- Solvent tanks and containers
- Water separators
- Muck cookers
- Stills
- Exhaust dampers
- Diverter valves
- Cartridge filter housings.

Any leaks detected must be repaired promptly. Repairs that do not require the outside procurement of parts must be completed within 24 hours. Additional repair parts that are needed must be ordered within 2 days and installed within 5 days of receipt. A log of all inspections and repairs made must be kept on site for 5 years.

Miscellaneous Good Housekeeping Requirements

There are also some additional EPA air requirements regarding general operation of a dry cleaning plant.

- Operate machines as per manufacturer's specifications and recommendations (40 CFR 63.322(d))

- Keep machine doors closed except when transferring clothes (40 CFR 63.322(c))
- Store perc and perc wastes in tightly sealed containers (40 CFR 63.322(j))
- Drain cartridge filters in their housing or another sealed container for at least 24 hours before disposal (40 CFR 63.322(i)).

Reporting Requirements

Dry cleaners are required to keep EPA up-to-date with basic information about their operations. Each facility owner or operator must have submitted an **initial report** (by June 18, 1994, or upon startup of a new facility) that provides the following information (40 CFR 63.324(a)):

- The name and address of the owner or operator
- The address (physical location) of the dry cleaning facility
- A brief description of the type of each dry cleaning machine at the facility
- Documented perchloroethylene consumption during the previous 12 months, or an estimate if documentation is not available
- A description of emissions control devices that have been installed or will be installed on each dry cleaning machine, where applicable
- Documentation to demonstrate that any room enclosures for transfer machines are constructed of materials impermeable to perc and are designed and operated to maintain a negative pressure at each opening at all times that the machine is operating.

Each facility owner or operator must submit a **compliance report** within 30 days after all requirements applicable to that facility take effect (40 CFR 63.324(b)). (For new facilities, this would be 30 days after startup.) This compliance report is intended to explain how the facility is complying with NESHAP requirements and must include the following information:

- The size category of the facility.
- Compliance status with regard to each applicable NESHAP requirement contained in 40 CFR 63.322, which includes all emission control equipment requirements, the leak detection program and good housekeeping requirements. The recommended form for this report is provided in Appendix C and is divided into two parts: a compliance report for pollution prevention, and a compliance report for control requirements.

The information contained in the report must be certified by a responsible official, which can be any one of the following:

- The president, vice president, secretary, or treasurer of the company that owns the dry cleaning facility
- An owner of the facility
- The manager of the facility
- A government official if the facility is owned by a Federal, State, city, or county government organization
- A ranking military officer, if the facility is located at a military base.

Facilities that later exceed perc consumption limits for their size category must file an additional compliance report within 180 days of the date that the change in the size category of the facility occurred.

Recordkeeping Requirements

All dry cleaners are required to keep the following information on site in a log book in order to demonstrate compliance with EPA air regulations. All information should be complete for the past 5 years of operation (40 CFR 63.324(d),(e)).

- Receipts of perc purchases.
- Monthly totals of perc purchases.

- Calculations performed on the first of each month to determine the total annual perc consumption for the previous 12 months. The result is then used to determine if the facility can still be classified in the same size category (as per Table 2). Facilities that have exceeded the consumption level for their size category are immediately categorized as the larger source but have 180 days to comply with requirements applicable to this new category. As mentioned in the reporting section, an additional compliance report must be submitted explaining the change in source category.

- Dates on which dry cleaning machines were inspected for leaks.

- The location of any detected leaks, and a record of repair activities.

- Results of temperature monitoring of refrigerated condensers.

- Results of carbon adsorber outlet concentrations.

In addition to maintaining the facility log, copies of the design specification and operating manuals must be kept on-site for each dry cleaning system and each emission control device at the facility.

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CHAPTER 5

EPA HAZARDOUS WASTE REGULATIONS APPLICABLE TO DRY CLEANERS

5.1 Background

Hazardous wastes that are not disposed of properly can cause immediate injury or death upon contact or may be released into soil, air or water and cause long-term damage to the environment. Regulations for the management of hazardous wastes are found in Parts 260 through 268 of Title 40 of the Code of Federal Regulations. Requirements for generators of hazardous wastes are most likely to be applicable to dry cleaners and are found in Parts 261.5 and 262. These requirements cover the generation, transportation, and management of hazardous wastes. The authority for these standards is derived from the Resource Conservation and Recovery Act (RCRA).

5.2 Applicability

Dry cleaning facilities are typically regulated as generators of hazardous wastes. (Most dry cleaners are not subject to regulations governing the treatment, storage, and disposal of hazardous wastes.) Applicability of hazardous waste requirements to generators is dependent on the types of waste generated, the amount generated, and the length of time that they are stored on-site.

Generators of wastes are responsible for determining whether the wastes are hazardous or not (40 CFR 261.11). Wastes can be regulated as hazardous if they are listed as such (40 CFR 261.31-33) or if they exceed certain levels of ignitability, corrosivity, reactivity, or toxicity (as defined in 40 CFR 261.21-24). Dry cleaning facilities typically generate wastes in the form of cooked powder residues, still bottom residues, and spent cartridges. These wastes are collectively listed as a single type of hazardous waste. They are all perc-based and have an EPA Hazardous Waste Number of F002. In addition, dry cleaners may occasionally dispose of unused perc (including spill residue or materials used to clean spills). Unused perc is listed as hazardous waste U210.

Table 4. Size Category Determination for Applicability of EPA Hazardous Waste Regulations

Amount of Perc Waste Generated Per Month	Size Category
Perc waste ≤ 220 lbs (100 kg)	Conditionally exempt small quantity generator (CESQG)
220 lbs (100 kg) < Perc waste < 2,200 lbs (1,000 kg)	Small quantity generator (SQG)
2,200 lbs (1,000 kg) ≤ Perc waste	Large quantity generator (LQG)

Applicability of standards for generators of hazardous wastes are dependent on the amount of waste generated (see **Table 4**). The weight limits are the same for most listed wastes, including perchloroethylene. Conditionally exempt small quantity generators (CESQGs) must generate less than or equal to 220 pounds (100 kg)[3] of perc waste per month (40 CFR 261.5). A small quantity generator (SQG) is one that generates more than 220 but less than 2,200 pounds (100 and 1,000 kg)[3] of waste per month (40 CFR 262.34, 262.44). A large quantity generator (LQG) is one that generates 2,200 or more pounds[3] of waste per month. Dry cleaning facilities will ordinarily not generate enough perc to be placed in this last category. Consequently, requirements for LQGs are not detailed in this manual. They are however, included in the hazardous waste regulations summary chart (see **Table 5**).

Each size category is also provided with limits on the length of time that they are allowed to store hazardous waste before it must be removed for disposal or treatment. These limits are as follows:

- **CESQG:** May store up to 2,200 lb (1,000 kg)[3] of hazardous waste on-site, with no time limit.
- **SQG:** May store up to 13,200 lb (6,000 kg)[3] of hazardous waste on-site, for up to 180 days (40 CFR 262.34(d)). A facility that must ship the waste over 200 miles (320 km) for treatment, storage, or disposal is allowed to store waste for up to 270 days (40 CFR 262.34(e)).

[3]A useful rule-of-thumb is that a 55-gallon can hold approximately 440 lbs. (200 kg) of hazardous waste, while a 15-gallon drum can hold approximately 120 lbs. (55 kg) of waste. The exact weight of a full container depends, however, on the type of waste that it holds.

Table 5. EPA Hazardous Waste Requirements for Dry Cleaners

Requirement	Category of Hazardous Waste Generator		
	Conditionally Exempt Small Quantity Generator (CESQG)	Small Quantity Generator (SQG)	Large Quantity Generator (LQG)
General Requirements			
Determination of whether waste is hazardous	Required	Required	Required
EPA I.D. Number	Not federally required	Required	Required
Personnel Training	Not federally required	Employees must be familiar with proper waste handling and emergency procedures	Hazardous waste handling training program required for all employees
Contingency Planning and Emergency Procedures	Not federally required	Basic plan required	Full plan required (40 CFR 262.34(a)(4))
Waste Storage Requirements			
On-Site Storage Quantity Limit	≤ 2,200 pounds (1,000 kg)	≤ 13,200 pounds (6,000 kg)	No limit
On-Site Storage Time Limit (Without Being Regulated As TSDF)	No limit	≤ 180 days OR ≤ 270 days if TSDF is over 200 miles away (storage in tanks or containers only)	≤ 90 days (storage in tanks or containers only)
Satellite Accumulation of Waste	Not applicable	≤ 55 gallons	≤ 55 gallons
Storage Maintenance Requirements	Not federally required	Partial compliance with technical standards under Part 265 for storage tanks and containers	Full compliance with management of tanks, containers, and drip pads
Transporting Requirements			
Packaging, Labeling, Marking and Placarding Requirements	Not federally required	In accordance with applicable DOT regulations	In accordance with applicable DOT regulations
Uniform Hazardous Waste Manifest	Not federally required	Required	Required
Exception Reports	Not federally required	Report missing manifest return copy within 60 days of transporter accepting waste	Contact transporter and TSDF within 35 days of transporter accepting waste to determine status; submit report within 45 days
Type of Facility Required for Offsite Management of Waste	State-approved solid waste facility or RCRA permitted/interim status hazardous waste facility	RCRA permitted/interim status hazardous waste facility	RCRA permitted/interim status hazardous waste facility
Land Disposal Notification Requirement	Not federally required	Required	Required

Table 5. EPA Hazardous Waste Requirements for Dry Cleaners (Continued)

Requirement	Category of Hazardous Waste Generator		
	Conditionally Exempt Small Quantity Generator (CESQG)	Small Quantity Generator (SQG)	Large Quantity Generator (LQG)
Recordkeeping Requirements			
Copy of manifests	Not federally required	Maintain copies for 3 years	Maintain copies for 3 years
Copies of biennial report	Not federally required	Not federally required	Maintain copies for 3 years (40 CFR 262.41)
Records of waste analyses	Not federally required	Maintain for 3 years after last shipment of waste	Maintain for 3 years after last shipment of waste

'Treatment, Storage and Disposal Facility

A CESQG that exceeds its quantity storage limit will be categorized as an SQG (40 CFR 261.5(g)), while an SQG facility that exceeds its quantity limit will typically be categorized as an LQG. An SQG facility that exceeds its time limit, on the other hand, will be classified as a hazardous waste treatment, storage and disposal facility and will be subject to all applicable regulations as such, including permitting requirements (40 CFR Parts 264, 265, 270). However, under circumstances that are beyond the control of the generator, an extension of up to 30 days may be granted at the discretion of the EPA Regional Administrator.

5.3 General Requirements

EPA Identification Number (40 CFR 262.12)

Each SQG must obtain an EPA identification number. This can be obtained by completing and submitting the Notification of Hazardous Waste Activity (EPA form 8700-12). CESQGs are federally exempt from this requirement but may be required by their State to obtain a number.

Preparedness and Prevention (40 CFR 262.34(d)(4))

SQGs are required to comply with Subpart C of Part 265, which contains requirements for preparedness and prevention of accidents in facilities with hazardous wastes on-site. Requirements applicable to dry cleaners include the following:

- Facilities must be equipped with an internal communications or alarm system (such as an intercom) and a device with which to summon outside emergency assistance (such as a telephone or two-way radio)

- Adequate aisle space must be maintained to allow the unobstructed movement of emergency personnel and equipment

- Arrangements must be made to familiarize police, fire departments, and emergency response teams with the layout and operation of the facility.

Contingency Planning and Emergency Procedures (40 CFR 262.34(d)(4),(d)(5))

SQGs are required to observe the following requirements:

- One employee must be designated the emergency coordinator on-site or on call at all times to be available to respond to an emergency and coordinate emergency response measures.

- The following information must be posted next to the telephone: the name and telephone number of the emergency coordinator, the telephone number of the fire department (unless the facility has a direct alarm) and the location of all fire extinguishers, spill control material and, if present, the fire alarm.

- The generator must ensure that all employees are thoroughly familiar with proper waste handling and emergency procedures that are relevant to their responsibilities.

- The emergency coordinator must respond to emergencies as follows:

  - In case of fire, call the fire department or attempt to extinguish the fire using a fire extinguisher.

  - Contain any spills to the extent possible and clean up the hazardous waste and contaminated materials and soil as soon as possible.

  - In case of a fire, explosion, or other release that could threaten human health outside the facility, notify the National Response Center at their 24-hr toll free number (1-800-424-8802). This report must include:

    -- The name, address, and EPA ID number of the generator
    -- The date, time and type of incident (e.g., spill or fire)
    -- Quantity and type hazardous wastes involved in the accident
    -- Extent of any injuries
    -- Estimated quantity and disposition of recovered materials.

CESQGs are federally exempt from these requirements but may be subject to State requirements. In any case, all generators of hazardous waste are strongly encouraged to develop a contingency plan to respond to emergency situations.

5.4 Waste Storage Requirements

Satellite Accumulation (40 CFR 262.34(c))

Satellite accumulation of wastes takes place at or near the point of waste generation, and is not included in determination of compliance with on-site storage weight and time limits, provided certain conditions are met:

- SQGs may accumulate no more than 55 gallons of hazardous waste in a container at or near the point of generation
- The container must be kept closed except for adding waste and marked "Hazardous Waste," or must otherwise identify the contents of the container
- After the 55 gallons has been accumulated, the container must be dated
- The generator then has 72 hours to move the container to the designated storage area for hazardous wastes.

Requirements for satellite accumulation do not apply to CESQGs, since they are not subject to on-site storage limits.

Storage Maintenance Requirements (40 CFR 262.34(d))

Dry cleaning facilities will generally store their wastes in drum containers. Storage of waste is subject to additional EPA regulations that ensure safe and proper handling of wastes and maintenance of containers.

SQGs that store their wastes in containers must comply with Subpart I of 40 CFR Part 265 except for sections 265.176 and 265.178. Applicable requirements for dry cleaners are as follows:

- Containers must be in good condition, compatible and non-reactive with the waste stored, and should be kept closed except when it is necessary to add or remove waste
- Storage areas should be inspected at least weekly for leaks or deterioration
- Each container must be clearly marked with the date that the container is filled and designated for disposal/treatment
- Each container must be clearly marked with the words "Hazardous Waste."

SQGs that store their wastes in tank systems must comply with 40 CFR 265.201. However, these requirements will not ordinarily apply to dry cleaning facilities.

CESQGs are federally exempt from these requirements but may be subject to State requirements.

5.5 Pre-Transport Requirements

Packaging, Labeling, Marking, and Placarding (40 CFR 262.30-33)

Before transporting each shipment of waste, generators must package, label, mark, and placard their wastes in accordance with the applicable Department of Transportation (DOT) regulations. Requirements include:

- Writing the manifest document number on each drum label.
- Labeling all drums with the 4-inch DOT POISON label.
- Marking all drums with the proper DOT shipping name and number.
- Each drum of 110 gallons or less should be marked with the following words and information in accordance with the marking requirements in 49 CFR 172.304:
  - HAZARDOUS WASTE—Federal Law Prohibits Improper Disposal. If found, contact the nearest police or public safety authority or the U.S. Environmental Protection Agency.
  - (Generator's Name and Address).
  - (Manifest Document Number).

- Ensuring that the transporter uses the proper 10¾-inch DOT POISON placard on all four sides of the truck that hauls away the waste.

For more detailed information on pre-transport requirements, refer to the applicable DOT regulations on packaging (49 CFR Parts 173. 178, 179), labeling (49 CFR Part 172. Subpart E), marking (49 CFR Part 172, Subpart D), and placarding (49 CFR Part 172, Subpart F).

5.6 Transporting Requirements (applicable to generators)

Manifest and Exception Reporting (40 CFR 262.20-23, 42)

All SQGs are responsible for ensuring that each shipment of hazardous waste originating from their facility arrives at its intended destination. Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund), generators are potentially liable for any mismanagement of their hazardous waste. The required tracking tool is the *Uniform Hazardous Waste Manifest* (EPA form 8700-22). This is a multi-copy form which must be signed by the generator, the transporter and the operator of the disposal or treatment facility, effectively tracking each shipment from "cradle to grave." Upon receipt of the waste shipment, the recipient will return a signed copy of the manifest to the generator, which serves as notification to the generator that the waste has arrived safely.

If the return copy of the manifest form is not received by an SQG within 60 days of shipment, the SQG must submit an *Exception Report* to the EPA Regional Administrator, which must include a legible copy of the manifest with some indication that the generator has not received confirmation of delivery. It is also recommended that the generator contact the transporter and/or the operator of the disposal/treatment facility to determine the status of the waste shipment.

CESQGs are not federally required to use the manifest form to track their waste shipments, but may be required to do so by the State. In any case, it is a recommended practice for all generators.

Disposal/Treatment Facility (40 CFR 261.5(g)(3))

SQGs are required to send their wastes to a RCRA-permitted facility. CESQGs are allowed to send their wastes to either a municipal solid waste facility or a RCRA-permitted facility, unless otherwise regulated by State requirements.

Land Disposal Restrictions Notification (40 CFR 268.7)

Part 268 of Title 40 CFR contains certain restrictions on land disposal of solid and hazardous wastes that can be safely treated or disposed of by other means. Disposal of perc wastes is subject to these restrictions. Under Section 268.7, generators are required to provide receiving facilities of each hazardous waste shipment with a land disposal restriction notification. The notification is subject to the following requirements:

- It must include the EPA hazardous waste number, the corresponding treatment standards (as detailed in 40 CFR 268.7(a)(1)(ii)), the manifest number of the waste shipment, and any waste analysis data that are available
- It must be signed by the generator
- A copy of the notification must be filed with the associated manifest copies.

CESQGs are federally exempt from this requirement but should comply with any State regulations regarding land disposal restrictions.

Self-Transporting of Hazardous Wastes

EPA regulations allow generators to transport their own hazardous wastes. They must, however, obtain an EPA transporter identification number and comply with all applicable DOT regulations. EPA requirements for transporters of hazardous wastes are found in 40 CFR Part 263.

5.7 Recordkeeping Requirements (40 CFR 262.40)

Each SQG must keep the following records available for inspection:

- A copy of each manifest signed by the generator and the initial transporter must be kept for 3 years, or until the return copy is received from the destination site. The return copy should be retained for 3 years from the date the waste was accepted by the initial transporter.
- Copies of Exception reports should be retained for 3 years from the due date of the report.
- Records of tests and waste analyses conducted to determine whether wastes are classified as hazardous must be kept until 3 years after the waste is last sent for treatment, storage, or disposal.
- The period of retention for all records are automatically extended during unresolved enforcement actions initiated by the EPA.

5.8 Hazardous Waste Treatment Regulations (40 CFR 265)

As previously mentioned, most dry cleaners are not subject to requirements that apply specifically to facilities that treat, store, or dispose of hazardous waste. One issue that deserves clarification, however, is the regulation of evaporators used to treat separator water containing perc.

Facilities that choose this method of handling separator water do **not** need to obtain a permit for hazardous waste treatment and are **not** subject to the requirements in 40 CFR 265. EPA has determined that evaporation meets the RCRA definition of "wastewater"[4] (40 CFR 260.10). Dry cleaners should check to ensure that evaporators are allowed under state and local environmental regulations.

[4]Letter from the Office of Solid Waste to Mr. William E. Fisher of the International Fabricare Institute dated June 2, 1993.

CHAPTER 6

EPA WASTEWATER REGULATIONS APPLICABLE TO PERC DRY CLEANERS

6.1 Applicability

The perc dry cleaning industry is subject to wastewater regulations enacted under the authority of the Clean Water Act. Wastewaters generated by dry cleaners may include separator water, vacuum water, and boiler blowdown. The only source of process wastewater that would generally be of concern, because of the content of perchloroethylene, is the separator water.

6.2 Discharge to Septic Systems

Generally, wastewater from a dry cleaning facility is discharged to Publicly Owned Treatment Works (POTWs). Discharge of perc wastes to a septic system is prohibited by the Safe Drinking Water Regulations because of the high potential of contaminating a drinking water aquifer. See Chapter 7—EPA Underground Injection Control Regulations Which Apply To Dry Cleaners.

6.3 Direct Discharge to Surface Waters

Any industrial facility that directly discharges its wastewater into surface waters must obtain a National Pollutant Discharge Elimination System (NPDES) Permit. The NPDES permit program under Section 402 of CWA protects surface waters of the United Sates from pollution by wastewater discharges. It is unlikely that any dry cleaners discharge directly to surface waters.

6.4 Indirect Discharge to POTWs

Wastewater discharged to POTWs consists of domestic sewage and industrial and commercial wastes (e.g., wastewater from dry cleaners) that are discharged **indirectly** to surface waters via sewers. Many POTWs are required through their NPDES permits to implement a pretreatment program that provides for control of toxics and compliance with narrative and

numeric pretreatment standards by its users. A POTW's authority to implement this program is contained in its local Sewer Use Ordinance (SUO).

Narrative pretreatment standards consist of general and specific prohibitions (40 CFR 403.5) which apply to all discharges to a POTW. General prohibitions specify that pollutants introduced into POTWs by a nondomestic source (e.g, dry cleaners) shall not pass through the POTW or interfere with the operation or performance of treatment works, create problems with sludge disposal, or cause health and safety problems for plant workers from exposure to chemicals.

The specific prohibitions prevent the discharge of pollutants that cause the following conditions:

- Fire or explosion hazard (including discharges with a closed-cup flashpoint below 140°F)
- Corrosive structural damage (no pH <5.0 s.u.)
- Solid or viscous pollutants in amounts which will cause obstruction of flow in the POTW resulting in interference
- Any pollutant released in a discharge at a flow rate and/or pollutant concentration causing interference
- Heat causing inhibition of biological activity and temperatures at the treatment plant exceeding 40°C (104°F)
- Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in quantities that will cause pass through and interference
- Pollutants that result in the presence of toxic gases, vapors, or fumes in the POTW that may cause acute worker health and safety problems
- Trucked or hauled wastes, except at locations designated by the POTW.

Numeric standards consist of categorical standards and local limits. Categorical standards apply to many types of specific industries (e.g., metal finishers), but there are no categorical

standards that apply to dry cleaners. POTWs required to develop a pretreatment program must develop local limits to implement the general prohibitions listed above. Local limits are site-specific numeric standards, enforceable by the POTW to ensure protection of the treatment works and the receiving water body. Local limits apply to all discharges to the POTW including those from dry cleaners.

As part of the pretreatment program, POTWs are required to identify significant industrial users (SIUs) as defined in 40 CFR 403.3. Dry cleaners may be considered significant based on their reasonable potential to adversely affect the POTW or to violate any pretreatment requirements (e.g., through spills or slug discharges). The regulations further require that POTWs use a control mechanism (i.e., permit) to ensure all applicable standards and requirements are met by the SIUs (40 CFR 403.8(f)(2)(iii)). Typically, dry cleaning facilities are not issued permits. However, dry cleaners should be aware of the requirements and contact the local POTW to determine the status of the facility. Permits issued by POTWs include effluent limitations, monitoring and reporting requirements, as well as standard and special conditions.

One of the reporting requirements, found at 40 CFR 403.12, that may be applied to a dry cleaner facility through a permit is the submission of a report at least once every 6 months regarding the nature, concentration and flow of the pollutants in the wastewater, based on a sampling study and analysis.

Additional reporting requirements that apply to all users of a POTW include:

- A requirement to notify the POTW, EPA, and State of any discharge to the POTW that would be considered hazardous if discharged in a different manner. A discharge of more than 15 kg per month of perc into the sewer would be considered a hazardous waste (as defined in 40 CFR Part 261). For dry cleaners, this is equivalent to 2.4 gallons of pure perc that may enter the sewers as a result of accidental spills.
- A requirement to promptly notify the POTW in advance of any substantial change in volume or character of pollutants in their discharge, including hazardous wastes.

- A requirement to submit a notice of discharges including slug loadings immediately upon identification of such discharges that could cause problems to the POTW.

Users subject to monitoring requirements must also comply with specific record keeping requirements and maintain the records for a minimum of 3 years. Such records include:

- The date, exact place, method, and time of sampling and the names of the person or persons taking the samples
- The dates the analyses were performed
- Who performed the analyses
- The analytical techniques/methods used
- The results obtained.

For information on the specific local requirements, the inspector should contact the local POTW.

6.5 Other Wastewater Handling Methods

Systems that can handle separator water without subsequent discharge include misters and evaporators. Use of these systems is not regulated under the Clean Water Act. The use of evaporators to treat separator water has also been exempted from hazardous waste treatment regulations (see Section 5.8). Dry cleaners should check with State and local agencies to determine if any requirements exist regarding the use of misters and evaporators.

CHAPTER 7

EPA UNDERGROUND INJECTION CONTROL REGULATIONS WHICH APPLY TO DRY CLEANERS

7.1 Background

Dry cleaners which use cesspools or septic systems capable of handling the sole sanitary waste of more than 20 people per day, or which use on-site disposal systems for the disposal of industrial waste (different types of Class V injection wells) are subject to Federal or State underground injection control (UIC) regulations established under the Safe Drinking Water Act (SDWA). A Class V injection well is a subsurface apparatus which meets the definition of an injection well and is used to emplace fluids above or into underground sources of drinking water (USDW). EPA regulates all large household, commercial and industrial cesspools and septic systems capable of serving more than 20 people no matter what they inject; excluded from EPA regulation are individual household cesspools and septic systems serving less than 20 people which inject solely sanitary waste.

7.2 Applicability

The Safe Drinking Water Act prohibits the injection of contaminants through wells which will cause a public water supply system to violate a national drinking water standard or otherwise endanger public health or the environment. A dry cleaning facility which disposes of perc waste and other hazardous chemicals into a Class V injection well is in violation of the Safe Drinking Water Act and should close its on-site disposal system immediately. EPA regulations applicable to Class V injection wells are found in Parts 144 and 146 of Title 40 of the Code of Federal Regulations (Underground Injection Control Program). EPA Class V guidance documents are under development.

7.3 Discharge of Industrial Wastes to On-Site Disposal Systems

An on-site disposal system typically includes a septic tank and fluid distribution system, or leachfield, which relies on biological organisms and gravity flow to treat and disseminate

solely sanitary wastewater. Disposal of even small quantities of industrial wastewater into a septic system is dangerous to the environment in two important ways: (1) industrial waste contains harmful chemicals which undergo minimal change in a septic tank before entering the subsurface environment and ground water resources; and (2) the industrial waste may also destroy biological organisms in the septic system necessary for sanitary wastewater treatment. Industrial waste fluids washed down floor drains into dry wells or cesspools undergo even less change before entering the ground.

Pure perc, the most commonly used dry cleaning solvent, is denser than water. When this solvent is released to the ground, it "sinks" below the water table and migrates down through sandy aquifers and fractures in bedrock.

7.4 EPA Class V Regulations and Guidance Applicable to Dry Cleaners

EPA Class V regulations and guidance applicable to dry cleaners focus on:

- Employing pollution prevention methods such as recycling, properly hooking into sewers, good housekeeping methods and best management practices, holding tanks and removal off-site, and waste minimization
- Reporting the location of all on-site disposal systems which receive industrial waste to the applicable State UIC program director
- Inspecting on-site disposal systems to determine if they are being properly operated and maintained, and if they are being used to dispose of perc waste or other hazardous chemicals
- Evaluating the public health and environmental risk of the injection fluid or on-site system based on the site and hydrogeological setting of the system
- Requiring analysis of injected fluids, ambient monitoring, additional soil or ground water sampling, as warranted
- Closing those on-site disposal systems which receive perc waste and other hazardous chemicals or otherwise endanger public health, USDW, or the environment
  - Requiring ground water remediation, as warranted
  - Closing cesspools.

Cesspools receive and discharge untreated solely sanitary water. All States except Hawaii have recognized the high risk posed by cesspools by, at a minimum, banning the construction of new cesspools.

EPA considers on-site disposal systems which receive perc waste and hazardous chemicals to be high-risk and associated with a large number of documented cases of ground water contamination, and advises closing them wherever they are found. The highest priority for closure are dry wells, cesspools and septic systems which discharge perc waste and hazardous chemicals into aquifers in Wellhead and Source Water Protection Areas, aquifers which are hydrologically connected to drinking water aquifers and aquifers designated as Sole Source Aquifers or aquifers which support sensitive ecosystems in estuaries, coastal zones and watersheds.

7.5 Inventory Requirements

EPA directly regulates Class V wells in 16 States,[5] American Samoa, the Virgin Islands, District of Columbia and for all Indian Tribes. In EPA jurisdictions, all dry cleaners who dispose of industrial waste in on-site disposal systems must, at a minimum, submit inventory information to be in compliance with UIC regulations. In addition, dry cleaners are required to submit inventory information for cesspools and septic systems which are capable of handling the sole sanitary waste of more than 20 people per day, even if perc waste or other hazardous chemicals are not disposed in the system. In the other 34 States, Guam, Puerto Rico and the Commonwealth of the Northern Mariannas, dry cleaners are subject to applicable State UIC regulations.

[5]Alaska, Arizona, California, Colorado, Hawaii, Indiana, Iowa, Kentucky, Michigan, Minnesota, Montana, New York, Pennsylvania, South Dakota, Tennessee, and Virginia.

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CHAPTER 8

POLLUTION PREVENTION AND WASTE MINIMIZATION

Full compliance by dry cleaning facilities with Federal, State, and local environmental regulations can go a long way towards reducing releases of perc to the air, water and soil. However, regulatory agencies primarily have only the authority to enforce waste management practices. The concept of pollution prevention involves reducing the actual amounts of wastes generated rather than having to treat or otherwise manage wastes that already have been generated. In order to progress further towards the broader goal of improved environmental quality, owners of dry cleaning plants should be encouraged to take the initiative for implementing pollution prevention programs in their facilities.

The implementation of a management style with an emphasis on waste minimization can reveal additional opportunities for pollution prevention, many of which require little or no financial investment. Some possibilities for pollution prevention in a dry cleaning plant are presented in this section. They are intended to be presented to dry cleaners not as requirements but as suggestions to be considered. Individual facility owners are often best qualified to evaluate the costs and benefits of pollution prevention opportunities and in deciding which practices would be appropriate to implement.

8.1 General Plant Management

Owners and operators of dry cleaning plants have the opportunity to take the lead in implementing a pollution prevention program in their facility. Training all employees in proper waste management procedures and in waste minimization opportunities can drastically reduce the chance of spills and accidents. All employees should also know the proper procedure in which to respond to a spill or accident. Owners have an incentive to reduce the potential risk of accidents and the actual damage caused, since they can be held legally liable for environmental damage caused by the operations in their facilities.

Conducting a waste audit can reveal opportunities for waste minimization that otherwise may not be obvious. Such a waste audit can consist of tracking all usage of perc and all resulting wastes to determine where perc losses are occurring and how they can be prevented. A "solvent mileage" figure can be calculated to quantify perc losses. This figure is generally expressed as gallons of perc used per 1,000 pounds of clothes dry cleaned. Although it may be difficult to determine the exact weight of clothes cleared, a reasonable estimate can be obtained from sales totals. This estimate can be used to calculate solvent mileage on a monthly basis.

Managers that are not aware of proper cost analysis methods often only consider initial purchase prices when considering investments in new equipment. However, when savings resulting from the new equipment are totaled up, the machine may pay for itself in as little as 3 years. These savings include reduced perc purchases, increased customer satisfaction leading to higher sales volumes, reduced waste management disposal costs, and reduced labor costs.

8.2 Operation and Maintenance Procedures

Improved general operations in a plant can reduce perc losses and minimize wastes significantly. Many operation-related pollution prevention opportunities deal with leak detection and prevention. Some ideas to consider are as follows:

- Seals and gaskets need to be periodically replaced even if they are not actually damaged. Rubber gaskets become brittle with age and no longer form a tight seal.
- Clean lint screens to avoid clogging fans and condensers.
- Open button traps and lint gaskets only long enough to clean them.
- Hand-held solvent detectors (see **Figure 10**) are now available that can detect lower concentrations of perc than can be detected merely by smell. These solvent detectors can be used to perform the periodic leak inspections and to test clothes leaving the dryer to ensure that all perc has been removed.
- Small leaks can be difficult to isolate. Drip pans can be placed below key connections in the dry cleaning machine so that leakage will collect in the pan and be identified. Cleaning and painting the floor periodically underneath the machine may also help to highlight drips.

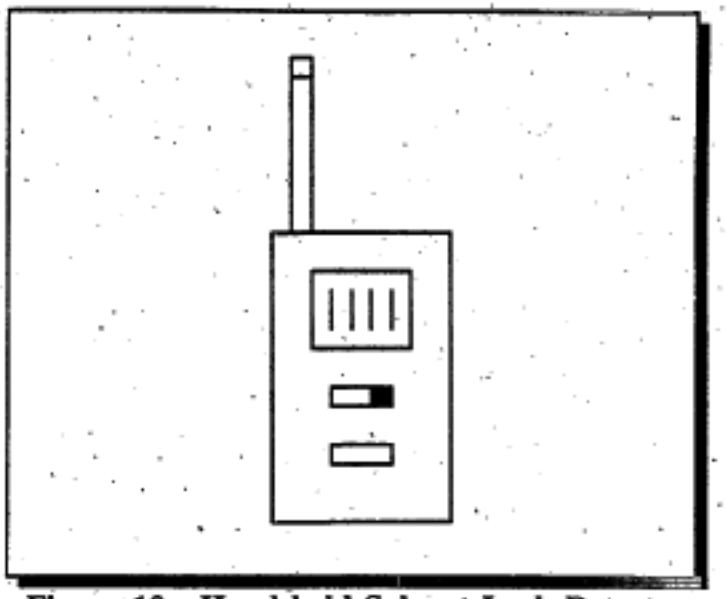


Figure 10. Hand-held Solvent Leak Detector

- Check air and exhaust ducts for holes and repair as needed.

- Check exhaust dampers, even if they are difficult to access directly. Closed-loop dryers have an exhaust damper that closes to prevent dryer exhaust from being vented during the drying cycle. Malfunctioning dampers have been a major source of fugitive emissions. They must be checked periodically as part of the required leak detection program to ensure that they are closing properly and not venting dryer process exhaust. The easiest way to check it is by placing and sealing a collapsed, inflatable bag over a outlet point in the air duct somewhere downstream of the damper. If an appropriate outlet is not conveniently located, a small, resealable test hole can also be drilled for this purpose. A bag that can be inflated by the outlet during the drying cycle signifies that the damper is not closing completely and needs to be repaired.

Other pollution prevention opportunities also exist. Often these opportunities can only be identified by inspecting the actual plant, but some are general common sense practices and many require little or no investment. For example:

- Avoid on-site storage of unused perc. There is no reason to do so if the plant is efficient (in terms of solvent mileage) and there is sufficiently frequent perc delivery in the area. Perc can be dispensed directly from a delivery tank car to the dry cleaning machine. Eliminating a perc storage area frees up more space in the plant and also reduces the potential for a spill.

- Keep hazardous spotting chemicals locked in a metal cabinet when not in use.

- Keep spotting materials in small, airtight, spillproof containers. After spotting, load clothes immediately into the dry cleaning machine.

- Label all raw materials to prevent unnecessary disposal.

- Keep tight lids and bungs on all containers to prevent evaporation and spills.

- Use spigots and pumps when dispensing new materials and use funnels when transferring wastes to storage containers to reduce the possibility of spills. Spill-proof dispensing systems are now available on the market.

- Never mix wastes together. Mixing wastes can make recycling impossible or make waste disposal much more expensive.

- Provide secondary containment, such as concrete drip pads, in storage areas for perc and perc wastes.

- If in an earthquake prone area, store containers in earthquake-proof containers or storage areas.

8.3 Equipment Modifications

- Eliminate the use of all transfer machines. The transfer process, which exposes clothes to the atmosphere before they are dried, is a major source of perc losses. Replacing all transfer machines with dry-to-dry machines will greatly reduce perc purchases in a plant.

- Installation of carbon adsorbers to reduce emissions vented during the aeration cycle. EPA regulations only require this for major sources but removal of aeration cycle perc vapors is also a pollution prevention opportunity in small and large area sources.

- Replace older or less efficient equipment. In some cases, it may be beneficial to replace outdated equipment to take advantage of newer, more efficient technologies. Applying proper cost analysis techniques to determine the real costs and benefits involved can help a facility owner make the correct decision as to whether to replace older equipment.

8.4 Process Modifications

- Recycle perc through distillation. This has not been required by EPA regulations but is widely practiced because significant cost savings in perc purchases and disposal costs makes it economically as well as environmentally beneficial. Dry cleaners that do not filter and distill their used perc need to be informed about the potential cost

savings. Reductions in perc usage of up to 96 percent have been reported by dry cleaners.

- Steam strip filter cartridges to reclaim perc. Steam stripping can recover more residual perc than simply draining the cartridges. Draining cartridges also requires that the entire machine be turned off for 24 hours, which is a major inconvenience. New dry cleaning machines can be equipped with steam strippers for convenient perc removal.

8.5 Alternative Cleaning Solvents

The popularity of perc stems from its non-flammability and its excellent cleaning properties. To a much lesser extent, a flammable petroleum distillate known as Stoddard Solvent is also used in the industry. Two other previously used solvents (CFC-113 and TCA) have been used but have been identified as potentially harmful to the ozone layer and are being phased out by the Clean Air Act beginning in 1995.

Existing alternative solvents with adequate cleaning ability have all been found to be more toxic or harmful than perchloroethylene. Stoddard solvent and its derivatives, for example, are highly flammable. Their use requires explosion-proof equipment. In some places, their use may be prohibited by the local fire department. TCA, although non-flammable and available at low cost, is too aggressive as a cleaning solvent, and also contributes to depletion of the ozone layer. To date, the "ideal" dry cleaning solvent has not yet been developed, but facility owners should be encouraged to keep informed about progress made in this area through national or regional dry cleaners associations.

8.6 Alternative to the Dry Cleaning Process

The dry cleaning process was developed to clean fabrics that cannot be immersed into water without being damaged in some way. One promising alternative to the dry cleaning process is under development and deserves special attention. Multiprocess wet cleaning is a method for hand cleaning clothes that relies on a controlled application of water and soaps. Unlike both the dry cleaning and the home laundry processes, in which each piece of clothing

receives the same treatment, multiprocess wet cleaning applies one of several cleaning processes to each individual garment depending on the type and condition of the fabric:

- Concentrated cleaning for heavily soiled garments, with a concentrated cleaning solution and a brush
- Extensive steaming, spotting and tumble drying
- Gentle handwashing of washable fabrics, followed by drip drying
- Tumble drying only for unstained garments that simply need to be freshened.

Pressing and finishing procedures remain the same as in the traditional dry cleaning process.

A preliminary study was jointly conducted in 1992 by the EPA, the Neighborhood Cleaners' Association (NCA), the International Fabricare Institute (IFI), the Massachusetts Toxics Use Reduction Institute, and Ecoclean (the commercial vendor of multiprocess wet cleaning) to evaluate the performance and economic competitiveness of this process, compared with perc dry cleaning.

The study concluded that although multiprocess wet cleaning is more labor intensive, the higher labor costs would be offset by lower costs for equipment and supplies and that overall costs would be comparable. An economic model showed that a facility dedicated only to wet cleaning could actually be more profitable than a traditional dry cleaning facility. Facilities that utilized both wet and dry cleaning were also shown to be profitable as long as the dry cleaning equipment was fully utilized. Performance, rated by customer satisfaction, was found to be equal to or better than the dry cleaning process, although further research is necessary to determine whether garments can be repeatedly cleaned only by multiprocess wet cleaning.

Multiprocess wet cleaning is a promising alternative that has the potential to eliminate all solvent wastes from the professional garment cleaning industry. Dry cleaners should be aware of this alternative, keep abreast of future developments, and weigh the costs and benefits of fully or partially converting their operations to this process.

CHAPTER 9

INSPECTION PROTOCOL

The primary purpose of the multimedia inspection protocol for dry cleaning facilities is to determine compliance with regulations that apply to air emissions, hazardous wastes, and industrial wastewater. The inspection protocol also focuses on encouraging and identifying opportunities for pollution prevention and the application of innovative technologies, with the overall objective of moving the facility beyond compliance to overall improved environmental quality.

The multimedia inspection will utilize a process-based approach in which the inspector identifies noncompliance with any applicable media or program specific regulation (air, water, solid waste).

This inspection protocol serves as a guide for the field personnel that perform these inspections, and includes procedures, an inspection checklist, and an example inspection report. During this multimedia compliance inspection, the inspector should generally follow procedures outlined in the EPA *Basic Inspector's Training Manual*.

The following activities are part of the multimedia compliance inspection protocol:

- Pre-inspection preparation
- On-site activities
  - Opening conference/discussion
  - Facility walk-through
    - Materials storage area
    - Process areas
    - Waste management areas
    - Records review
  - Closing conference/discussion

- Preparation of inspection report
- Follow-up activities.

Each of these activities is briefly described in the inspection procedures discussed below.

9.1 Pre-Inspection Preparation

The inspector should review any existing information on the facility including any previous noncompliance problems. Using the available information, he/she should complete Part 1, General Facility and Management Information, of the Inspection Checklist which covers general aspects of the regulatory programs to be covered during this inspection (i.e., air, hazardous wastes, wastewater). This information can then be verified during the inspection.

9.2 On-Site Activities

9.2.1 Opening Conference/Discussion

During the opening conference/discussion, it is important that the inspector point out that, in addition to the more traditional objective of compliance evaluation, the inspection focuses on providing compliance assistance to the facility and identifying potential pollution prevention and innovative technology opportunities. Thus, inspection questions will address raw materials used, housekeeping procedures and process modifications as well as wastes generated.

The inspector should verify the information in Part I, General Facility and Management Information, of the checklist and obtain any missing information. These questions are intended to obtain an overall general evaluation of the regulations that apply to the facility (including whether the facility currently has any permits).

9.2.2 Walk-Through of Facility

The Inspection Checklist is designed to walk-through the facility in a process-oriented manner, addressing these activities sequentially:

- General Housekeeping (including raw materials information)
- Dry Cleaning Process Areas
- Waste Handling and Management
- Records and Files.

For each of these areas, applicable media-specific compliance questions and pollution prevention, innovative technology and recycling questions are included in the checklist.

General Housekeeping/Materials Storage

General housekeeping/materials storage is a separate section of the checklist, although evaluation of these activities should be ongoing throughout the inspection of the facility. Specifically, the inspector should be observing operation and maintenance and housekeeping throughout the facility walk-through in the storage areas, process areas, and waste management areas. The walk-through of the facility should begin at the receiving area and storage area for raw materials.

Dry Cleaning Process

For each process or activity listed in the checklist, the inspector should verify the following for each process or activity (using the checklist questions):

- Description of process and equipment used
- Types and amounts of materials used
- Types and amounts of wastes generated
- General condition.

The checklist contains notes for the inspector regarding compliance issues with respect to individual wastes.

For each type of waste generated by the process or activity, the inspector should inquire about general or specific pollution prevention techniques and innovative technology as presented in the checklist.

When inspecting the process or activity areas, the inspector should document any evidence of noncompliance that presents an imminent threat to human health or the environment (e.g., leaks or spills of hazardous materials). He/she should take immediate action to notify (1) the facility of the situation and (2) the appropriate program office for follow-up action.

The checklist is meant only as a guide for questions, and the inspector should ask any other questions to obtain additional information or clarify answers.

Waste Handling and Management

The waste handling and management section of the checklist is organized by type of waste being managed and includes wastewater, air emissions, and hazardous wastes. This part of the inspection will generally involve hazardous wastes storage containers, wastewater treatment equipment, and air pollution control equipment.

For the waste handling and management areas, the inspector should examine the following (using the appropriate checklist questions):

Air and Wastewater

- Any existing permits and permit requirements
- Type of treatment process
- Condition of treatment equipment
- Any wastestreams discharged to the atmosphere, or to a sewer or an on-site disposal system
- Any instances of noncompliance.

Hazardous Wastes

- Any existing permit (if classified as a storage facility)
- Condition of storage containers and storage area
- Length of storage
- Waste transportation
- Any noncompliance.

The inspector should identify any media transfer of wastestreams resulting from pollution control/management practices (e.g., generation of sludges from wastewater treatment or generation of scrubber water from air pollution control equipment).

Records and Files

Evaluation of these areas will also involve records review. For example, if a facility has a wastewater permit, the inspector should review the permit for selected requirements (e.g., limited parameters and self-monitoring frequency) and then assess compliance with these requirements. All violations should be documented. The sections in the checklist that will likely require records review are appropriately marked.

9.2.3 Closing Conference/Discussion

As part of the closing conference/discussion, the inspector should do the following:

- Convey the results of the inspection to the facility including all obvious violations noted. **However, inspectors should refrain from discussing monetary penalty amounts, or whether penalties will be assessed for any violations noted. Inspectors should also make the facility representative aware that any decision with regard to a particular violation is subject to confirmation after evaluation of the inspection findings by appropriate EPA program offices.**
- Clarify information obtained and ask any outstanding questions.
- Discuss in general potential pollution prevention and innovative technology opportunities.

Some pollution prevention opportunities may require expenditures for new equipment. Although it is difficult, especially for smaller facilities, to purchase expensive new equipment directed primarily at reducing wastes, the inspector should identify indirect advantages, either tangible or intangible, whenever possible or applicable. For example:

- Process improvements may reduce worker risk and facilitate compliance with OSHA regulations
- Reduction in perc usage saves the dry cleaner money
- Reduction in waste generation will also reduce the costs of waste disposal
- New cleaning machines can improve the quality of the dry cleaning service, resulting in increased customer satisfaction and fewer returns for recleaning
- Improved image in community can result from improved environmental practices.

- Distribute general or dry cleaning specific compliance assistance literature.
- Distribute general or dry cleaning specific pollution prevention or innovative technology literature.
- Distribute list of selected references.
- Provide contacts at appropriate agencies that give compliance or technical assistance (e.g., hotlines, technical assistance offices).

The inspector should communicate to the facility that all results are preliminary until the follow-up review is completed.

9.3 Preparation of Assessment Report

After the inspection, the inspector should complete the assessment report form in Appendix B. This form contains sections for results of both compliance assessment and identification of pollution prevention and innovative technology opportunities.

Compliance Assessment Sections

The inspector should note any actual and potential violations identified during the inspection.

Pollution Prevention Sections

The inspector should at a minimum provide a list of opportunities identified based on the checklist questions. However, the checklist questions do not cover the full range of pollution prevention opportunities for a dry cleaning facility. If the inspector has additional time and the appropriate references (such as those listed in Appendix E), he/she can identify other potential opportunities that can be listed in the inspection report.

9.4 Follow-Up Activities

After the inspection, the inspector will be responsible for recommending the follow-up actions that should be taken. At a minimum, the inspector should provide a report to the facility (example report form shown in Appendix B) that contains a compliance assessment with a list of actual or potential violations and a list of pollution prevention opportunities (including innovative technology). Additional potential follow-up actions to be taken include the following:

- Referral to specific program office for comprehensive follow-up inspection
- Referral to technical assistance office for follow-up assistance
- Follow-up inspection to determine if facility has implemented pollution prevention techniques.

After conferring with his/her supervisor, the inspector may take one or more of these actions as per State policy depending on the particular findings of the inspection. In some States there are special programs targeted at dry cleaning facilities. In some situations the inspector may decide that it is appropriate to refer the facility to a media-specific program office because violations that could potentially pose a significant risk to human health or the environment were found during the inspection. In any case, the appropriate follow-up actions should be determined in coordination with the inspector's supervisor and applicable enforcement policies.

APPENDIX A

MULTIMEDIA INSPECTION CHECKLIST FOR DRY CLEANING FACILITIES

TABLE OF CONTENTS

MULTIMEDIA INSPECTION CHECKLIST FOR DRY CLEANING FACILITIES

I. GENERAL FACILITY AND MANAGEMENT INFORMATION

A. General Facility Information

1. Date of Inspection _____

2. Facility Name: _____

3. Facility Telephone Number: _____

4. Facility Address (physical location): _____

5. Mailing Address (if different): _____

6. Facility Owner Contact Information (Name and phone): _____

7. Facility Operator/Manager (if different from owner) (Name and phone): _____

8. Inspector(s):

Name	Title/Affiliation	Phone Number
(1)_____	_____	_____
(2)_____	_____	_____
(3)_____	_____	_____

9. Original establishment date of facility: _____

10. Establishment date of current ownership:

11. Establishment date at current location:

12. Is a new annual perc consumption level calculated on the first of each month reflecting usage for the past 12 months? Yes [ ] No [ ]

    Record most current annual perc consumption:
    Gallons: _____
    From _____ (month, year) to _____ (month, year)
    Date calculated: _____

13. Size categorization of facility under federal air emissions regulations (based on information in Question 12):

    [ ] Small area source
    [ ] Large area source
    [ ] Major source

14. Size categorization of facility under federal hazardous waste regulations:

    [ ] CESQG
    [ ] SQG
    [ ] LQG

15. Does the facility have an EPA ID # as a generator of hazardous wastes? Yes [ ] No [ ]

    EPA ID #:

16. Does the facility discharge wastewater into a municipal sewer? Yes [ ] No [ ]

    Name of POTW:
    Permit # (if applicable):

    If not, please explain.

B. Facility Management

17. Is the dry cleaner a member of a trade association? Yes [ ] No [ ]

    If so, name of association: _____

    If not, ensure that the dry cleaner is aware of the role of trade organizations in providing compliance assistance. Distribute national or local trade association literature as appropriate to serve as initial contact points.

18. What types of training activities are conducted at the facility (include safety, emergency procedures, and pollution prevention programs)?

19. Has a pollution prevention or waste minimization plan been developed by the facility? Yes [ ] No [ ]

If so, describe:

20. Has the facility evaluated which wastes are probable candidates for reductions through pollution prevention activities? Yes [ ] No [ ]

If so, list the wastes and describe pollution prevention activities currently being undertaken.

21. Is the facility owner familiar with multiprocess wet cleaning? Yes [ ] No [ ]

Has the facility considered experimenting with multiprocess wet cleaning? Yes [ ] No [ ]

II. DRY CLEANING PROCESS AREA

A. Dry Cleaning General Equipment Information

22. Supply the following information about the dry cleaning machines in use at the facility:

#	Type[i]	Date Installed	New or Existing	Manufacturer and model number	Perc filtration system(s)[ii]	Perc vapor recovery system[iii]	Installation date of perc vapor recovery system
1							
2							
3							

[i]Dry-to-dry (D) or Transfer (T)
[ii]List all types of filters used
[iii]Refrigerated condenser (RC) or carbon adsorber (CA)

23. New transfer machines are no longer allowed. Is the facility in compliance? Yes [ ] No [ ]

24. If existing transfer machines are used, has the facility performed a thorough cost analysis to determine what the payback period would be on the purchase of a dry-to-dry machine? Yes [ ] No [ ]

25. Existing transfer machines in major sources must be surrounded in a room enclosure by September 23, 1996. Is the facility in compliance? Yes [ ] No [ ]

26. Were any carbon adsorbers that are used as perc vapor recovery systems for drying process vapors installed before September 22, 1993? Yes [ ] No [ ]

27. Does the facility use a carbon adsorber as a residual perc recovery system to vent aeration vessel vapors? Yes [ ] No [ ]

B. Refrigerated Condensers Performance Monitoring

28. Are temperature sensors for refrigerated condensers installed for each machine in accordance with manufacturers' specifications? Yes [ ] No [ ]

29. Are temperature sensors for all machines designed to measure temperatures from 32°F to 120°F to an accuracy of ±2°F? Yes [ ] No [ ]

30. Record temperature sensor readings if available:

Temperature Sensor	Machine #1	Machine #2	Machine #3	Criteria for compliance
(a) Dryer airstream at condenser outlet (°F)				Less than or equal to 45°F
(b) Washer airstream at condenser inlet (°F)				none
(c) Washer airstream at condenser outlet (°F)				none
(d) Washer airstream net temp. drop {(b) - (c)} (°F)				At least 20°F
(e) In compliance? (Y/N)				

C. Carbon Adsorber Performance Monitoring (complete if carbon adsorbers are used)

31. Are sampling ports for carbon adsorbers properly located in accordance with federal regulations (8 duct diameters downstream and 2 duct diameters upstream of any flow disturbance)? Yes [ ] No [ ]

32. Are they kept closed when not in use? Yes [ ] No [ ]

33. Indicate the established period desorption schedule for each machine (as necessary, as indicated by tests, but at least weekly). Note the date when each adsorber was last desorbed and measure the perc concentration in the exhaust with a colorimetric detector while the drying cycle is on. (Note: It is important to note that the perc concentration should usually be measured at the end of a use cycle, just prior to desorption. A measurement taken at any other time only ensures that the adsorber is in compliance at that time, not necessarily for the duration of the use cycle. However, given time and logistical limitations, inspections schedules generally cannot accommodate desorption schedules for each machine.

Machine #	Indicate Periodic Desorption Schedule[i]	Date Last Desorbed	Measured Perc Concentration in Exhaust Airstream	Use of Carbon Adsorber *(A, B, or C as indicated by table below)*[ii]	Perc Concentration Limit *(as indicated by table below)*[ii]
1					
2					
3					

[i]Indicate schedule specifics (day of week, etc.)

Carbon adsorber is used:	Indicate with	Perc Limit (ppm)
As main perc vapor recovery system	A	100
As residual vapor recovery system (tested during aeration while the door is open)	B	100
As residual vapor recovery system (tested during aeration while the door is closed)	C	300

D. Leak Detection

34. Is the odor of perc readily detectable anywhere in the facility? Yes [ ] No [ ]

If so, where?

35. Is the leak detection program conducted weekly or biweekly as required? Yes [ ] No [ ]

36. Allow owner or designated representative to guide you through the facility and demonstrate procedures for the weekly/biweekly leak detection inspection for each machine. The inspection should include the items listed below. Tabulate results and record any leaks detected.

Inspection done by:

[ ] Sight, smell, and feel
[ ] Monitoring instrument (Type: _____)

#	Components:	Signs of Leaking (Y, N, n/a)?			Explain all "Yes" answers:
		Machine #1	Machine #2	Machine #3	
1	Hose & pipe connections, fittings, couplings, valves				
2	Door gaskets & seatings				
3	Pumps				
4	Solvent tank & containers				
5	Water separators				
6	Muck cookers				
7	Stills				
8	Exhaust dampers				
9	Diverter valves				
10	Filter gaskets and seatings				
11	Cartridge filter housings				

37. Are seals and gaskets periodically replaced before they become brittle? Yes [ ] No [ ]

38. What type of solvent leak detection systems are in use?

39. What other methods does the facility use to detect leaks? (e.g., drip pans, etc.)

40. In transfer machines, is the exhaust damper easily accessible? Yes [ ] No [ ]

If not, is there a suitable outlet downstream for testing the proper closure of the exhaust damper? Yes [ ] No [ ]

E. Miscellaneous Operation and Maintenance

41. Are all machines operated as per manufacturer's specifications and recommendations? Yes [ ] No [ ]

42. Are machine doors kept closed except when transferring clothes? Yes [ ] No [ ]

43. Are all spent cartridges drained at least 24 hours before disposal? Yes [ ] No [ ]

Alternatively, are they steam stripped before disposal? Yes [ ] No [ ]

III. PERC AND PERC WASTE HANDLING AREAS

A. Perc Storage and Dispensing

44. Is perc stored on-site? Yes [ ] No [ ]

If so, is all perc stored in tightly sealed containers and free from leakage? Yes [ ] No [ ]

45. How frequently is perc delivery available?

46. How is perc delivered to the dry cleaning machines?

B. Satellite Waste Accumulation Area

47. Do satellite waste accumulation areas contain less than 55 gallons of accumulating wastes? Yes [ ] No [ ]

48. Are all full containers sealed and dated less than 3 days (72 hours) ago? Yes [ ] No [ ]

49. Are all containers tightly closed and free from leakage? Yes [ ] No [ ]

50. Are all containers clearly marked as hazardous waste? Yes [ ] No [ ]

C. Hazardous Waste Storage Area

51. Are all containers tightly closed and free from leakage or deterioration? Yes [ ] No [ ]

52. Are all containers clearly marked as hazardous waste? Yes [ ] No [ ]

53. Do all containers bear a date representing the day the container was filled and designated for disposal/treatment? Yes [ ] No [ ]

54. Are all the dates on the containers in compliance with on-site waste storage time limits for generators of hazardous wastes? (No limit for CESQGs, 180 days for SQGs, 270 days for SQGs that must transport their wastes 200 miles.) Yes [ ] No [ ]

Note the date of oldest container:

If the time limit is exceeded, does the facility have the required EPA permit for storage facilities? Yes [ ] No [ ]

55. The facility must not be storing quantities of waste in excess of the quantity storage limits. Determine whether the facility is in compliance as follows:

Determine the total weight of all perc wastes in the storage area.

Each 15-gallon container can hold about 120 lbs (55 kg) of perc waste.

Each 55-gallon container can hold about 440 lbs (200 kg) of perc waste.
Maximum quantity limits are as follows: CESQG—2,200 lbs; SQG—13,200 lbs.

For 15-gallon containers:

_____ × 120 lbs/container = _____ lbs in storage
# of full containers:

For 55-gallon containers:

_____ × 440 lbs/container = _____ lbs in storage
# of full containers

On-site storage quantity limit (lbs): _____

Is the facility in compliance? Yes [ ] No [ ]

D. Hazardous Wastes Shipping

56. Does the facility ship hazardous wastes off-site? Yes [ ] No [ ]

57. Does the facility track the wastes with a manifest form? Yes [ ] No [ ]

58. Are all containers labeled with the 4-inch DOT POISON label? Yes [ ] No [ ]

59. Are all containers marked with the proper DOT shipping name and number? Yes [ ] No [ ]

E. Wastewater Management

60. Does the facility discharge industrial wastewater into the following?

Municipal sewer Yes [ ] No [ ]

On-site disposal system which meets the definition of injection well Yes [ ] No [ ]

Holding tank Yes [ ] No [ ]

For discharges to municipal sewers:

61. Does the facility have a current wastewater permit? Yes [ ] No [ ]

If not, has the facility applied for a new permit? Yes [ ] No [ ]

62. What parameters are limited and/or monitored in the facility's permit?

Parameter	Limit	Monitoring Frequency
(1)_____	_____	_____
(2)_____	_____	_____
(3)_____	_____	_____

63. Is monitoring conducted as required by the permit (with respect to sampling location, frequency)? Yes [ ] No [ ]

64. Does the facility have a sampling point available which is representative of its process wastewaters discharged to the POTW? Yes [ ] No [ ]

65. Is the effluent currently in compliance with the limitations established in the permit? Yes [ ] No [ ]

If not, describe all violations found, including parameter limit exceeded, date of violation, and any follow-up samples or actions.

66. Has the discharge changed significantly since the permit was issued? Yes [ ] No [ ]

If so, was the permitting authority notified? Yes [ ] No [ ]

Describe the changes.

67. Describe any wastewater treatment employed at the facility.

68. If the facility discharges to a POTW, has it complied with the recordkeeping and reporting requirements contained in 40 CFR 403.12(o)? Yes [ ] No [ ]

69. Has the facility ever discharged 15 kg of perc to the POTW within a calendar month? Yes [ ] No [ ]

If so, were the proper authorities notified of the release? Yes [ ] No [ ]

For discharges to injection wells:

70. Does the facility have a Federal or State UIC permits? Yes [ ] No [ ]

71. Does the facility dispose of perc wastes and/or other hazardous chemicals in the injection well? Yes [ ] No [ ]

For discharges to holding tanks:

72. Does the facility have the tank pumped out regularly by a licensed waste hauler for proper, legal disposal? Yes [ ] No [ ]

IV. RECORDS AND FILES INSPECTION

A. Reporting

73. Did the facility file an initial report with EPA (by June 18, 1994, or upon startup for new facilities)? Yes [ ] No [ ]

Date filed: _____

74. Did the facility file a compliance report (within 30 days of startup or 30 days after NESHAP regulations take effect)? Yes [ ] No [ ]

Date filed: _____

Note to inspector: Ask to see copies of the initial report and compliance report.

B. Recordkeeping

75. Are the results of temperature sensor monitoring for refrigerated condensers kept on record for the past 5 years of operations? Yes [ ] No [ ]

Do the results show that all refrigerated condensers are in compliance with performance requirements? Yes [ ] No [ ]

76. Are the results of colorimetric tube monitoring for carbon adsorbers kept on record for the past 5 years of operations? Yes [ ] No [ ]

Has a periodic (at least weekly) desorption schedule been established and adhered to for each adsorber? Yes [ ] No [ ]

Does monitoring of adsorbers take place during the last run prior to desorption? Yes [ ] No [ ]

Do the results show that all carbon adsorbers are in compliance with performance requirements? Yes [ ] No [ ]

77. Are monthly totals of perc purchase records kept on-site for the past 5 years? Yes [ ] No [ ]

78. Are records of weekly/biweekly inspections for leaks available for each machine for the last 5 years (or since startup of facility)? Yes [ ] No [ ]

79. Are any detected leaks repaired within 24 hours whenever possible? Yes [ ] No [ ]

80. Are all needed repair parts ordered within 2 working days? Yes [ ] No [ ]

81. Are needed repair parts installed within 5 days of receipt? Yes [ ] No [ ]

82. Note any recurring problems:

83. Are copies of manifest forms maintained on-site for 3 years? Yes [ ] No [ ]

84. Are any return copies of manifest forms (from the waste receiving facility) missing? Yes [ ] No [ ]

85. If so, have exception reports been filed and copies maintained on-site? Yes [ ] No [ ]

What action has been taken to determine the status of the waste shipment or notify the proper authorities?

86. Are copies of the design specifications and operating manuals for each dry cleaning system and each emission control device kept on-site at the facility? Yes [ ] No [ ]

87. Has the solvent mileage been calculated for each machine? Yes [ ] No [ ]

If so, record the results (gallons perc/1,000 lb clothes) _____

If not, does the facility owner understand how to calculate solvent mileage and how to use it as a waste minimization indicator? Yes [ ] No [ ]

V. ADDITIONAL COMMENTS

APPENDIX B

MULTIMEDIA COMPLIANCE/POLLUTION PREVENTION ASSESSMENT REPORT FORM FOR DRY CLEANING FACILITIES

FACILITY NAME AND LOCATION: _____

_____

_____

MAILING ADDRESS:
(if different) _____

_____

_____

FACILITY CONTACT(S):

Name	Title/Affiliation	Phone Number

INSPECTION DATE: _____

INSPECTOR(S):

Name	Title/Affiliation	Phone Number

REASON FOR VISIT: _____

AREAS VISITED: _____

DATE FORM COMPLETED: _____

I. GENERAL FACILITY DESCRIPTION

Provide a general description of the facility (e.g., building age, length of business at this location, previous owners/operators at the site, dry cleaning capacity, brief description of processes, brief overview of wastes generated and disposal methods used, and status of P2 implementation efforts).

II. COMPLIANCE ASSESSMENT

Air Quality
Describe any observed or potential violations:

Referral to other program office _____

Hazardous Waste [Resource Conservation and Recovery Act (RCRA)]
Describe any observed or potential violations:

Referral to other program office _____

Wastewater
Describe any observed or potential violations:

Referral to other program office _____

III. POLLUTION PREVENTION (P2) AND INNOVATIVE TECHNOLOGY OPPORTUNITIES IDENTIFIED

List each waste at the facility with any associated P2 and innovative technology opportunities. Use additional sheets for more information.

Raw Materials or Waste Description	Pollution Prevention and Innovative Technology Opportunities

IV. CONCLUSIONS AND RECOMMENDED FOLLOW UP

A. Compliance Violations and/or Issues [add regulatory references (i.e., 40 CFR 261.30)].

B. Potential P2 Opportunities and Innovative Technologies. (These are only suggestions and not regulatory requirements.)

C. Follow-up Responses to Compliance Questions Asked During On-Site Assessment. (This section should include responses to compliance questions asked during the on-site assessment that the inspector was unable to answer.)

APPENDIX C

RECOMMENDED FORMS FOR DRY CLEANERS

(taken from *Draft Plain English Guide for Perc Dry Cleaners* (U.S. EPA, 1995))

1. Sample Log Sheet for Perc Purchases
2. Monthly Machine Maintenance and Perchloroethylene Log
3. Initial Notification Report
4. Compliance Report for Pollution Prevention
5. Compliance Report for Control Requirements

FIGURE II-5

SAMPLE LOG SHEET FOR PERC PURCHASES PAGE____

Starting amount: _____(Amount of perc purchases reported in **INITIAL NOTIFICATION)**

MONTH/DAY/YEAR	AMOUNT OF PERC PURCHASED	12-MONTH AVERAGE

* Staple or keep all perc purchase receipts with this form.

Figure II-2

MONTHLY MACHINE MAINTENANCE AND PERCHLOROETHYLENE LOG

CHECK EVERY 7 DAYS

Put N – for No Leak Put Y – for Perceptible Leak	Week ___ Date	Week ___ Date	Week ___ Date	Week ___ Date	Week ___ Date
1) Hoses, pipe connections, fittings, couplings, and valves					
2) Door gaskets and seatings					
3) Filter gaskets and seatings					
4) Pumps					
5) Solvent tanks and containers					
6) Water separators					
7) Muck cookers					
8) Stills					
9) Exhaust dampers					
10) Diverter valves					
11) Cartridge filter housings					

CHECK EVERY 7 DAYS (Applicable Sections Only) (Monitoring not required for existing plants until September 22, 1996)	Week ___ Date	Week ___ Date	Week ___ Date	Week ___ Date	Week ___ Date
Transfer system (washer) temperature difference (Measure difference between inlet and outlet temperatures of refrigerated condenser) (Write °C or °F)					
Dry-to-dry machines, dryers, and reclaimers Condenser temperature (outlet) (Write °C or °F)					
Carbon adsorber concentration (ppm)					

Perchloroethylene purchased: _____ gallons (calculate on first of every month).
Running 12 month total _____ gallons per year.
Date and description of repairs or adjustments _____

Were parts ordered? _____ If yes, when and what parts were ordered? _____
If yes, when were parts installed? _____
Staple or keep all solvent purchase receipts which also show perc volume, parts/repair invoices, and repair orders (if written) with this sheet and save for at least five years.

FACILITY ID NO._____(FROM ADDRESS LABEL)

INITIAL NOTIFICATION REPORT

1. Print or type the following for each separately located dry cleaning plant (facility). The owner of more than one plant must fill out a separate form for each plant.

   Owner/Operator: _____
   Mailing Address: _____
   City: _____ State: _____ Zip: _____

   Plant Address:

   Street Address: _____
   City: _____ County: _____
   State: _____ Zip: _____
   Phone Number: _____

2. Check the box below if:

   ☐ your dry cleaner is a pick-up store.
   ☐ your dry cleaning plant has only coin-operated dry cleaning machines that are operated by the customers.
   ☐ your dry cleaning plant has only petroleum dry cleaning machines.

   If you checked either box above, you can STOP HERE and return the form to the address given in the accompanying letter.

3. Write in the total volume of perchloroethylene (perc) purchased for ALL of the machines at the dry cleaning plant over the past 12 months:

   _____ gallons

   NOTE: If perchloroethylene purchase records have not been kept at the plant, the volume may be estimated for this initial report.

   Method of determining gallons (circle one):

   actual estimated

4. Next to each machine type listed below, write the number of machines of that type located at your plant:

   _____ Dry-to-Dry _____ Transfer

FACILITY ID NO._____(FROM ADDRESS LABEL)

5. Provide the following information for EACH MACHINE at your plant. If you have more than four machines at your plant, make additional copies of this page.

	Machine 1	Machine 2	Machine 3	Machine 4
Machine Type (Circle One)	Dry-to-Dry or Transfer	Dry-to-Dry or Transfer	Dry-to-Dry or Transfer	Dry-to-Dry or Transfer
Date Machine Was Installed				
Control Device (Use WORKSHEET on Pages 5 & 6 to Determine Required Control)				
Date Control Device Was Installed or Is Planned to Be Installed				

6. The following pollution prevention practices must be performed at your plant starting on 12/20/93. These practices are listed on an attached sheet that can be posted next to your machine:

   - Conduct a weekly leak detection and repair program to inspect all dry cleaning equipment for leaks that are obvious from sight, smell, or touch. NOTE: This program is required every other week if you wrote NO CONTROL REQUIRED in the shaded box in Question 5.

   - Repair leaks within 24 hours after they are found, or order repair parts within two working days after detecting a leak that needs repair parts. Install the repair parts by five working days after they are received.

   - Keep a log of the weekly (or biweekly) results of the leak detection and repair program.

   - Follow good housekeeping practices, which include keeping all perc and wastes containing perc in covered containers with no leaks, draining cartridge filters in closed containers, and keeping machine doors shut when clothing is not being transferred.

FACILITY ID NO._____(FROM ADDRESS LABEL)

- Operate and maintain all dry cleaning equipment according to manufacturers' instructions.

7. The following records must be kept at your plant:

   - A log of the results of the leak detection and repair program.
   - A log of the amount of perc purchased for the past 12 months, calculated each month.
   - The operation and maintenance manuals for all dry cleaning equipment at the plant.

8. If a room enclosure is installed on a transfer machine as stated in Question 4, the following information about the room enclosure must be attached to this report:

   - Description of the materials that the room enclosure is constructed of to show that it is impermeable to perchloroethylene;
   - Explanation of how the room enclosure is operated to maintain a negative pressure at all time while the transfer machine is operating; and
   - Explanation of how the room enclosure exhausts into a carbon adsorber.

9. Print or type the name and title of the Responsible Official for the dry cleaning plant:

   Name: _____ Title: _____

   A Responsible Official can be:

   - The president, vice president, secretary, or treasurer of the company that owns the dry cleaning plant;
   - An owner of the dry cleaning plant;
   - The manager of the dry cleaning plant;
   - A government official, if the dry cleaning plant is owned by the Federal, State, City, or County government; or
   - A ranking military officer, if the dry cleaning plant is located at a military base.

FACILITY ID NO._____(FROM ADDRESS LABEL)

WORKSHEET

A. To find out if control is required:

Check all boxes that apply:

☐ I reported less than 140 gallons in Question 3 (page 1).

☐ I reported less than 200 gallons in Question 3 (page 1) **AND** reported only transfer machines in Question 4 (page 1).

If you checked either box above and all your machines were installed before 12/9/91, you can STOP HERE. Write NO CONTROL REQUIRED in the shaded box on page 2 for each machine at your plant that was installed before 12/9/91. For those machines installed on or after 12/9/91, continue with the rest of the worksheet.

YOU ARE FINISHED WITH THE WORKSHEET. GO TO QUESTION 6 (page 2).

If you did not check a box above, go to Part B below.

B. Control is required. Fill out Part B for EACH MACHINE at your plant.

Check the appropriate box:

☐ Machine was installed BEFORE 12/9/91.

If you checked this box, your required control is a refrigerated condenser or a carbon adsorber that was installed before 9/22/93. Write REFRIGERATED CONDENSER or CARBON ADSORBER in the shaded box below the machine on page 2.

Control must be installed by 9/22/96.

FACILITY ID NO._____(FROM ADDRESS LABEL)

☐ Machine was installed ON OR AFTER 9/22/93.

If you checked this box, your required control is a dry-to-dry machine with refrigerated condenser.

Write DRY-TO-DRY MACHINE WITH REFRIGERATED CONDENSER in the shaded box below the machine on page 2. NOTE: NO NEW OR USED TRANSFER MACHINES CAN BE INSTALLED AFTER 9/22/93.

Control must be installed when machine is installed.

☐ Machine was installed ON OR AFTER 12/9/91 AND BEFORE 9/22/93.

If you checked this box, your required control is a dry-to-dry machine with refrigerated condenser. Write DRY-TO-DRY MACHINE WITH REFRIGERATED CONDENSER in the shaded box below the machine on page 2.

If the machine you have is NOT a dry-to-dry machine with a refrigerated condenser, the machine must use either a refrigerated condenser or carbon adsorber from 9/22/93 until 9/22/96. After 9/22/96, any carbon adsorbers on dry-to-dry machines must be replaced with a refrigerated condenser. If the machine is a transfer machine with a carbon adsorber or a refrigerated condenser, you may keep this installation until 9/22/96. If you plan to keep a dry-to-dry machine with a carbon adsorber or a transfer machine with either a refrigerated condenser or carbon absorber until 9/22/96, also write this information in the shaded box.

C. To find out if additional control is required:

Check all boxes that apply:

☐ I reported 1,800 gallons or less in Question 3 (page 1).

☐ I reported 2,100 gallons or less in Question 3 (page 1) **AND** I reported only dry-to-dry machines in Question 4 (page 1).

If you checked either box above, you can STOP HERE. No additional controls are required.

YOU ARE FINISHED WITH THE WORKSHEET. RETURN TO QUESTION 5 (page 2) and write in the dates the controls were or will be installed.

If you did not check a box above, go to Part D below.

FACILITY ID NO._____(FROM ADDRESS LABEL)

D. If additional control is required, fill out Part D for EACH machine at your plant:

Check a box below, if it applies:

☐ Machine is a dry-to-dry machine that was installed ON or AFTER 12/9/91.

If you checked this box, you are also required to install a supplemental carbon adsorber.

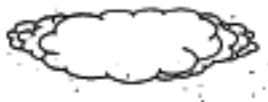
Write SUPPLEMENTAL CARBON ADSORBER in the shaded box below the machine on page 2.

☐ Machine is a transfer machine.

If you checked this box, you are also required to install a room enclosure. Write ROOM ENCLOSURE in the shaded box below the machine on page 2.

YOU ARE FINISHED WITH THE WORKSHEET. RETURN TO QUESTION 5 and write in the dates all controls were or will be installed (page 2).

FACILITY ID NO._____(from address label)



COMPLIANCE REPORT FOR POLLUTION PREVENTION

1. Print or type the following for each separately located dry cleaning plant (facility). The owner of more than one plant must fill out a separate form for each plant.

   Owner/Operator: _____
   Mailing Address: _____
   City: _____ State: _____ Zip: _____

   Plant Address:

   Street Address: _____
   City: _____ County: _____
   State: _____ Zip: _____
   Phone Number: _____

2. Write in the total volume of perchloroethylene (perc) purchased for ALL of the machines at the dry cleaning plant over the past 12 months (based on actual purchase receipts):

   _____ gallons

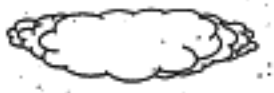
3. The following pollution prevention practices must be performed at your plant as of 12/20/93.

   - Conduct a weekly leak detection and repair program to inspect all dry cleaning equipment for leaks that are obvious from sight, smell, or touch. NOTE: This program is required only every other week (biweekly) if you reported NO CONTROLS REQUIRED in the INITIAL NOTIFICATION REPORT.

   - Repair leaks within 24 hours after they are found, or order repair parts within two working days after detecting a leak that needs repair parts. Install the repair parts by five days after they are received.

   - Keep a log of the weekly (or biweekly) results of the leak detection and repair program.

   - Follow good housekeeping practices, which include keeping all perc and wastes containing perc in covered containers with no leaks, draining cartridge filters in closed containers, and keeping machine doors shut when clothing is not being transferred.



- Operate and maintain all dry cleaning equipment according to manufacturers' instructions.

4. The following records must be kept at your plant:

   - A log of the results of the leak detection and repair program;
   - A log of the amount of perc purchased for the past 12 months, calculated each month; and
   - The operation and maintenance manuals for all dry cleaning equipment at the plant.

5. Print or type the name and title of the Responsible Official for the dry cleaning plant:

   Name: _____ Title: _____

   A Responsible Official can be:

   - The president, vice president, secretary, or treasurer of the company that owns the dry cleaning plant;
   - An owner of the dry cleaning plant;
   - The manager of the dry cleaning plant;
   - A government official, if the dry cleaning plant is owned by the Federal, State, City, or County government; or
   - A ranking military officer, if the dry cleaning plant is located at a military base.

FACILITY ID NO._____(from address label)

COMPLIANCE REPORT FOR CONTROL REQUIREMENTS

1. Print or type the following for each separately located dry cleaning plant (facility). The owner of more than one plant must fill out a separate form for each plant.

   Owner/Operator: _____
   Mailing Address: _____
   City: _____ State: _____ Zip: _____

   Plant Address:

   Street Address: _____
   City: _____ County: _____
   State: _____ Zip: _____
   Phone Number: _____

2. Write in the total volume of perchloroethylene (perc) purchased for the dry cleaning plant over the past 12 months (based on actual purchase receipts):

   _____ gallons

FACILITY ID NO._____(from address label)

3. Fill out the table below for each machine at your plant. Use the WORKSHEET on pages 5 and 6 of the INITIAL NOTIFICATION REPORT to determine required controls. A copy of the INITIAL NOTIFICATION REPORT is attached.

	Machine Type (Dry-to-Dry or Transfer)	Date Machine Purchased	Required Control	Date Control Installed
1				
2				
3				
4				
5				
6				
7				

4. If you listed a required control in Question 3 (page 1) for any machine at your plant, you must monitor your control.

To find out what type of monitoring is required, check all boxes that apply:

☐ I use a refrigerated condenser on a dry-to-dry machine to meet the required control.

If you checked this box, you are required to perform a weekly monitoring test to show that the temperature on the outlet side of the refrigerated condenser is less than or equal to 45 degrees Fahrenheit.

☐ I use a refrigerated condenser on a transfer machine to meet the required control.

If you checked this box, you are required to perform a weekly monitoring test to show that the temperature on the outlet side of the refrigerated condenser on the transfer dryer is less than or equal to 45 degrees Fahrenheit AND that the difference between the inlet and the outlet temperature of the refrigerated condenser on the transfer washer is greater than or equal to 20 degrees Fahrenheit.

☐ I use a carbon adsorber on a dry-to-dry or a transfer machine to meet the required control, OR

FACILITY ID NO._____(from address label)

☐ I use a supplemental carbon adsorber on a dry-to-dry machine and the exhaust passes through the carbon adsorber IMMEDIATELY UPON door opening.

If you checked either of the two boxes above, you are required to perform a weekly monitoring test with a colorimetric detector tube to show that the concentration of perc in the exhaust from the carbon adsorber is not over 100 parts per million.

☐ I use a supplemental carbon adsorber on a dry-to-dry machine and the exhaust passes through the carbon adsorber BEFORE the machine door is opened.

If you checked this box, you are required to perform a weekly monitoring test with a colorimetric detector tube to show that the concentration of perc inside the dry cleaning machine drum at the end of the drying cycle is not over 300 parts per million.

☐ I use a room enclosure on a transfer machine.

If you checked this box, you are required to vent all air from inside the room enclosure through a carbon adsorber. The room enclosure must be constructed of materials impermeable to perc, must be designed and operated to maintain a negative pressure at all times while the transfer machine is operating, and must exhaust to a carbon adsorber.

FACILITY ID NO._____(from address label)

5. Print or type the name and title of the Responsible Official for the dry cleaning facility:

Name: _____ Title: _____

Examples of Responsible Officials:

- The president, vice president, secretary, or treasurer of the company that owns the dry cleaning facility;
- An owner of the dry cleaning facility;
- The manager of the dry cleaning facility;
- A government official, if the dry cleaning facility is owned by the Federal, State, City, or County government; or
- A ranking military officer, if the dry cleaning facility is located at a military base.

APPENDIX D

STATE REQUIREMENTS

(Insert State Requirements for area of country where this document is being used.)

APPENDIX E

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BIBLIOGRAPHY

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